

IBM Workload Scheduler
Planning and Installation
Version 9.5 Fix Pack 7

Note

Before using this information and the product it supports, read the information in [Notices on page cccxc](#).

This edition applies to version 9, release 5, modification level 0 of IBM Workload Scheduler (program number 5698-WSH) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this publication

About this task

This *IBM Workload Scheduler Planning and Installation* provides information for planning, installing, migrating, and configuring an IBM Workload Scheduler network.

What is new in this release

Learn what is new in this release.

For information about the new or changed functions in this release, see *IBM Workload Automation: Overview*, section *Summary of enhancements*.

For information about the APARs that this release addresses, see the IBM Workload Scheduler Release Notes at [IBM Workload Scheduler Release Notes](#) and the Dynamic Workload Console Release Notes at [Dynamic Workload Console Release Notes](#). For information about the APARs addressed in a fix pack, refer to the readme file for the fix pack.

New or changed content is marked with revision bars.

Accessibility

Accessibility features help users with a physical disability, such as restricted mobility or limited vision, to use software products successfully.

With this product, you can use assistive technologies to hear and navigate the interface. You can also use the keyboard instead of the mouse to operate all features of the graphical user interface.

For full information, see the Accessibility Appendix in the *IBM Workload Scheduler User's Guide and Reference*.

Technical training

Cloud & Smarter Infrastructure provides technical training.

For Cloud & Smarter Infrastructure technical training information, see: <http://www.ibm.com/software/tivoli/education>

Support information

IBM provides several ways for you to obtain support when you encounter a problem.

If you have a problem with your IBM software, you want to resolve it quickly. IBM provides the following ways for you to obtain the support you need:

- Searching knowledge bases: You can search across a large collection of known problems and workarounds, Technotes, and other information.
- Obtaining fixes: You can locate the latest fixes that are already available for your product.
- Contacting IBM Software Support: If you still cannot solve your problem, and you need to work with someone from IBM, you can use a variety of ways to contact IBM Software Support.

For more information about these three ways of resolving problems, see the appendix about support information in *IBM Workload Scheduler: Troubleshooting Guide*.

Part I. Planning

An overview of the IBM Workload Automation environment and describes how to plan for the installation.

Chapter 1. Network planning

Network planning on IBM Workload Automation.

About this task

How to plan your IBM Workload Scheduler network.

IBM Workload Scheduler environment

An IBM Workload Scheduler network consists of a set of linked workstations on which you perform job processing. A network is composed of one or more domains, each having a *domain manager* workstation acting as a management hub, and one or more *agent* workstations.

About this task

Using IBM Workload Scheduler you can run your workload in one of the following ways:

Statically

To run existing job types, for example docommand and scripts on specific workstations of fault-tolerant agent or standard agent type.

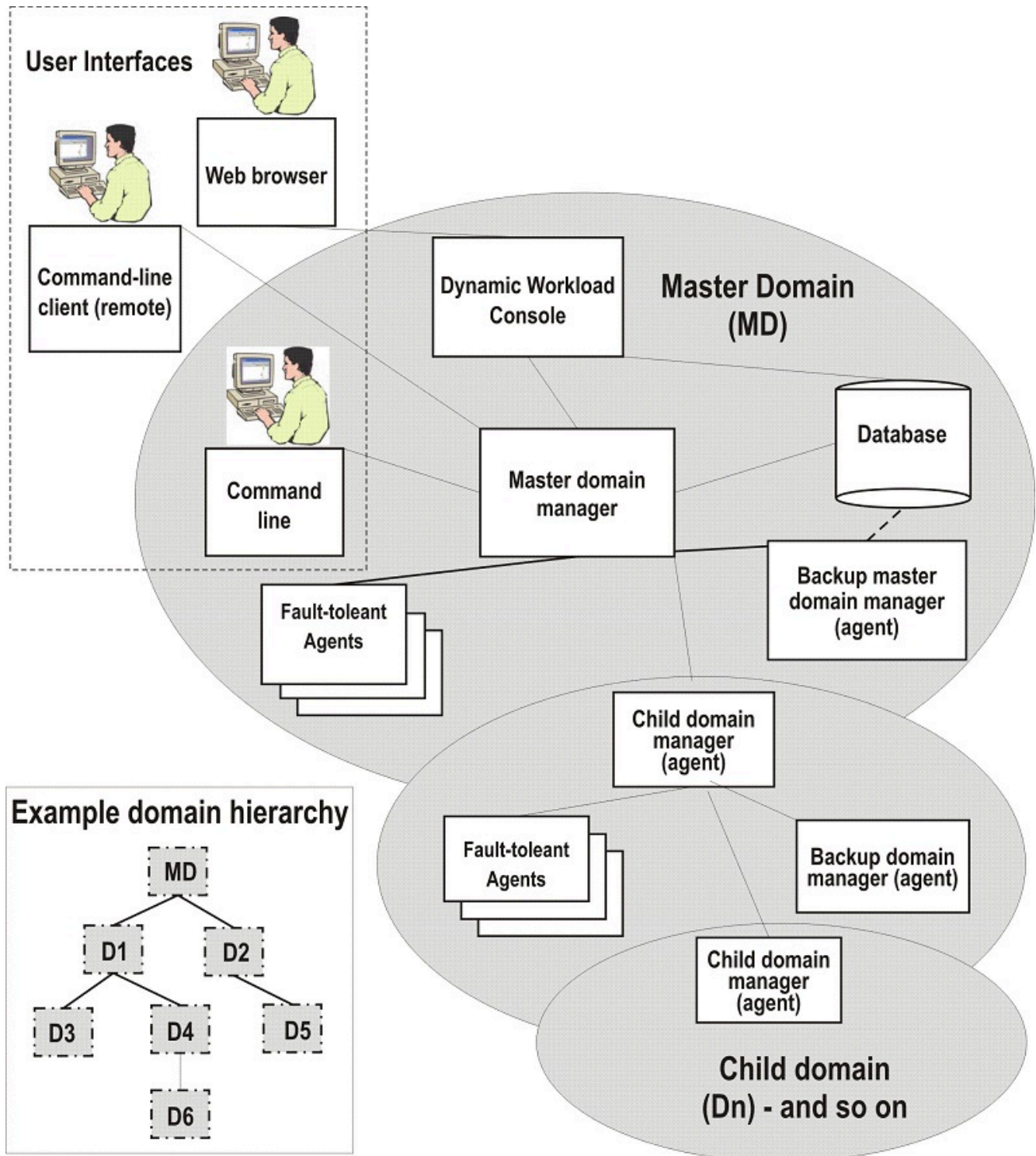
Dynamically

To run existing job types and job types with advanced options, allowing the product to assign it to the workstation that best meets both the hardware and software requirements needed to run it.

Depending on how you want to run your workload you have to install and configure different components in your network.

[Figure 1: Graphical overview of IBM Workload Scheduler environment to run static workload on page 13](#) gives a graphical overview of a typical IBM Workload Scheduler environment to run static workload:

Figure 1. Graphical overview of IBM Workload Scheduler environment to run static workload



In Figure 1: Graphical overview of IBM Workload Scheduler environment to run static workload on page 13 the master domain is shown with the principle components to run workload statically, and two levels of subdomain. The available user

interfaces are also indicated. An example is provided of the basic domain hierarchical structure, where each domain is named "D1", "D2, and so on. All of these concepts are explained in the following section:

To run your workload statically install the following components:

Master domain manager

The master domain manager is the highest level workstation of a IBM Workload Scheduler network. It contains or connects to the relational database that stores scheduling object definitions. It creates or updates a production file when the plan is created or extended and then distributes the file to the network. It performs all logging and reporting for the network. It can perform the role of event processing server for the event-driven workload automation feature.

Backup master domain manager

Define a backup master domain manager at installation to point to either the database being used by the master domain manager or to a mirror of that database. In this way the backup master domain manager has the latest data available to it at all times.

Domain manager

Install this component if you need a multi-domain network and you want to manage workload by assigning it to a predefined workstation that is to run your workload statically. In a multi-domain network all domains below the master domain have fault-tolerant agents configured to be a domain manager to manage the workstations in its domain. A domain manager can manage fault-tolerant, standard, and extended agents. Each domain manager is a fault-tolerant agent in the domain of the next higher level. To define a domain manager, install a fault-tolerant agent on your workstation and then define it as **manager** in the workstation definition.

Backup domain manager

Install this component if you want a backup to your domain manager. If your domain manager experiences problems, you can configure any fault-tolerant agent as the domain manager and switch to it with a simple procedure.

Agent

An agent is a workstation in the network that runs the jobs which are controlled by the IBM Workload Scheduler master domain manager. After installing an agent, you define its type by using the workstation definition.

Fault-tolerant agent

An fault-tolerant agent can resolve local dependencies and launch jobs in the absence of a domain manager. It has a copy of the production control file. This allows fault-tolerant agents to continue processing even if the dynamic domain manager or the network connection is down. With a simple reconfiguration, they can serve as subordinate *domain managers*. To define a fault-tolerant agent, install a fault-tolerant agent on your workstation and then define it as fault-tolerant in the workstation definition.

Standard agent

An agent that launches jobs only under the direction of its domain manager. It is not fault-tolerant. To define a standard agent, install a fault-tolerant agent on your workstation and then define it as a standard agent in the workstation definition.

Extended agent

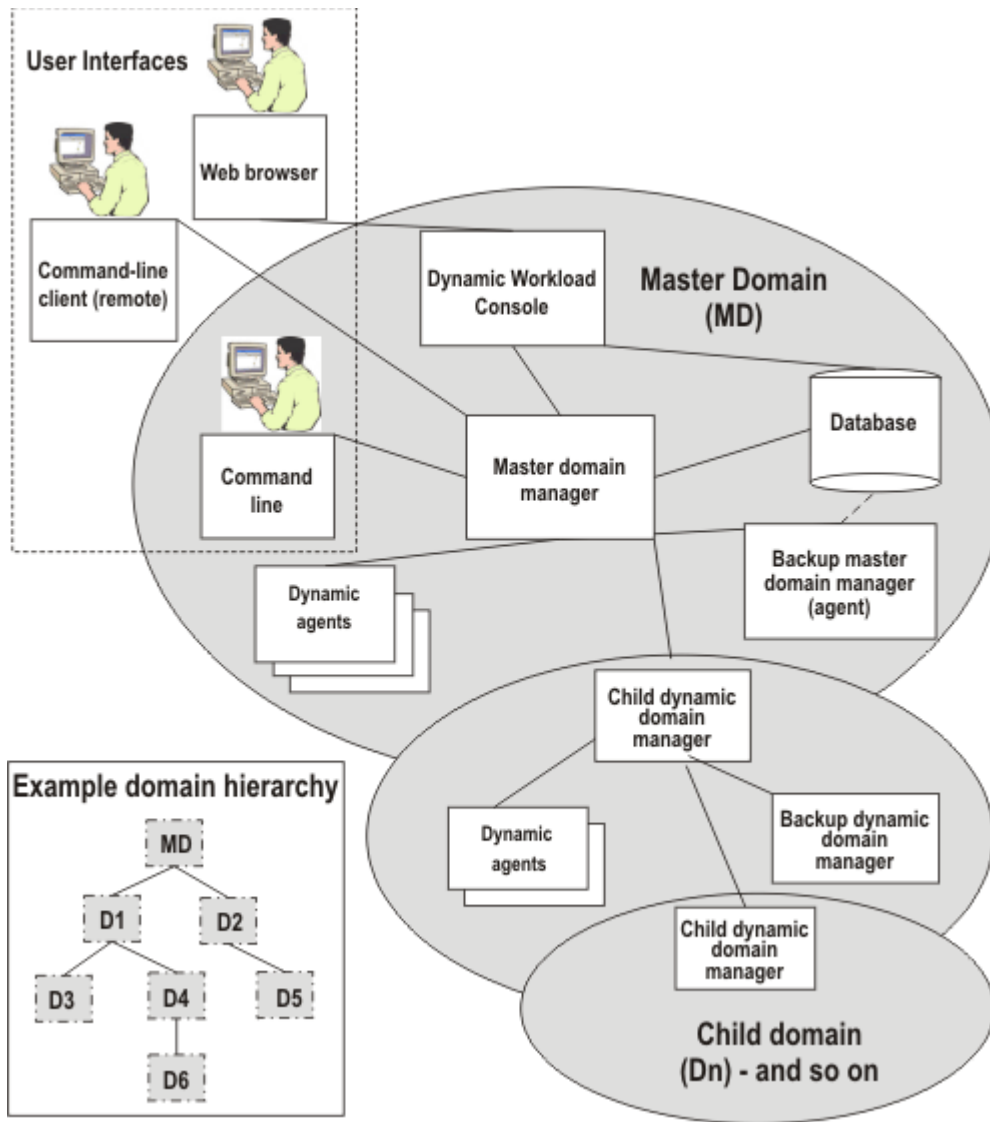
Extended agents are logical definitions (hosted by a physical workstation) used to extend job processing to selected applications (SAP R/3, PeopleSoft, and z/OS®). For information about installing an extended agent, see *IBM Workload Automation: Scheduling Applications with IBM Workload Automation*.



Note: All agents with special roles (master domain manager, backup master domain manager, domain manager, backup domain manager) can also work as fault-tolerant agents with jobs scheduled on them.

Figure 2: [Graphical overview of IBM Workload Scheduler dynamic environment on page 16](#) gives a graphical overview of a typical IBM Workload Scheduler environment to run dynamic workload:

Figure 2. Graphical overview of IBM Workload Scheduler dynamic environment



In [Figure 2: Graphical overview of IBM Workload Scheduler dynamic environment on page 16](#) the master domain is shown with the principle components to run workload dynamically, and two levels of dynamic subdomain. The available user interfaces are also indicated. An example is provided of the basic domain hierarchical structure, where each domain is named "D1", "D2, and so on. All of these concepts are explained in the following section.

If you want to run your workload dynamically install the following components:

Master domain manager

The master domain manager is the highest level workstation of a IBM Workload Scheduler network. It contains or connects to the relational database that stores scheduling object definitions. It creates or updates a production file when the plan is created or extended and then distributes the file to the network. It performs all logging and reporting for the network. It can perform the role of event processing server for the event-driven workload automation feature.

Backup master domain manager

Define a backup master domain manager at installation to point to either the database being used by the master domain manager or to a mirror of that database. In this way the backup master domain manager has the latest data available to it at all times.

Dynamic Domain manager

Install this component if you need a multi-domain network and you want to manage your workload both statically that dynamically. All domains below the master domain have dynamic domain managers to manage the workstations in its domain. Each dynamic domain manager is an agent in the domain of the next higher level. To define a dynamic domain manager, install a dynamic domain manager and then perform the [Configuring a dynamic domain manager on page 186](#) procedure.

Backup dynamic domain manager

Install this component if you want a backup to your dynamic domain manager. If your dynamic domain manager experiences problems, you can switch to it with a simple procedure.

Agent

An agent is a workstation in the network that runs the jobs which are controlled by the IBM Workload Scheduler master domain manager.

Dynamic agent

An agent that has the following capabilities:

Run workload dynamically

It communicates with the server the status of its resources. In this way the product is able to dynamically run your workload to the best available resources by:

- Automatically discovering scheduling environment resources.
- Automatically following resource changes
- Requesting additional resources when needed
- Matching job requirements to available resources
- Controlling and optimizing use of resources

The characteristics listed above provide high availability and load balancing potentialities to your environment and well suit virtualized environments.

When a job is submitted, either as part of a job stream in the plan or through ad hoc submission, IBM Workload Scheduler checks the job requirements, the available resources and the related characteristics and submits the job to the resource that best meets the requirements to run it.

Run both existing job types and job types with advanced options

It can run:

- Existing job types. For example docommand and scripts.
- Job types with advanced options

Manage dynamic workload broker logical resource

It can remotely run, from the agent, the dynamic workload broker **resource** command on the server. To manage the **resource** command you must also install the Java™ run time.

After installing the agent, you define its type by using [Configuring a dynamic agent on page 188](#).

In a simple configuration, dynamic agents connect directly to the master domain manager or to the dynamic domain manager. However, in more complex network topologies, if the network configuration prevents the master domain manager or the dynamic domain manager from directly communicating with the dynamic agent, for example, if the agents are behind a firewall and need to communicate through the internet, or if they need to communicate with a Network Address Translation (NAT) process, then you can configure your dynamic agents to use a local or remote gateway. In this way, communication is concentrated in a single connection, reducing the number of connections to the master domain manager or to the dynamic domain manager. For more information about the gateway parameters specified when installing a dynamic agent, see [Agent installation parameters - twsinst script on page 108](#).

For more information about gateway configuration, see the network communications information in the *Administration Guide*.

Extended agent

Extended agents are logical definitions (hosted by a physical workstation) used to extend job processing to selected applications (SAP R/3, PeopleSoft, and z/OS®). For information about installing an extended agent, see *IBM Workload Automation: Scheduling Applications with IBM Workload Automation*.

IBM Workload Scheduler interfaces

The IBM Workload Scheduler has user interfaces from which you can manage your production environment.

About this task

You can manage your production environment from the following user interfaces:

Master domain manager command lines

The master domain manager command lines are installed automatically when you install the master domain manager. This command lines interface are run only from the workstation serving as the master domain manager. From the command lines, you can administer the master specific binaries and options. A backup master domain manager command lines also exist on the master domain manager configured as backup instance.

Dynamic Workload Console

The web-based interface for creating, modifying, monitoring, controlling, and deleting IBM Workload Scheduler objects. You can interface with the console from any system in the network where a supported web browser is installed. When you install a Dynamic Workload Console also the **z/OS® Connector** is installed, which is a component that connects IBM Z Workload Scheduler and the Dynamic Workload Console. For more information, see *IBM Z Workload Scheduler: Planning and Installation Guide*.

Command-line client

A component of IBM Workload Scheduler installed only with a fault-tolerant agent that allows you to implement the following commands on the master domain manager from another workstation: The commands you can use are the following:

- Composer
- Optman
- Planman showinfo and unlock (the other planman commands must be run locally on the master domain manager)

dynamic workload broker command line

Installed and configured automatically when you install a master domain manager. It includes commands to directly submit and manage jobs for dynamic scheduling, manage job JSDL definitions and resources, and more.

For more information about Workload Broker, see the documentation in the previous release at [IBM Workload Automation 9.4.0](#) and browse to the **Scheduling Workload Dynamically** manual.

For a more detailed description of the IBM Workload Scheduler components, see *IBM Workload Automation: Overview*.

Planning the environment

Typical installation scenarios for products and components.

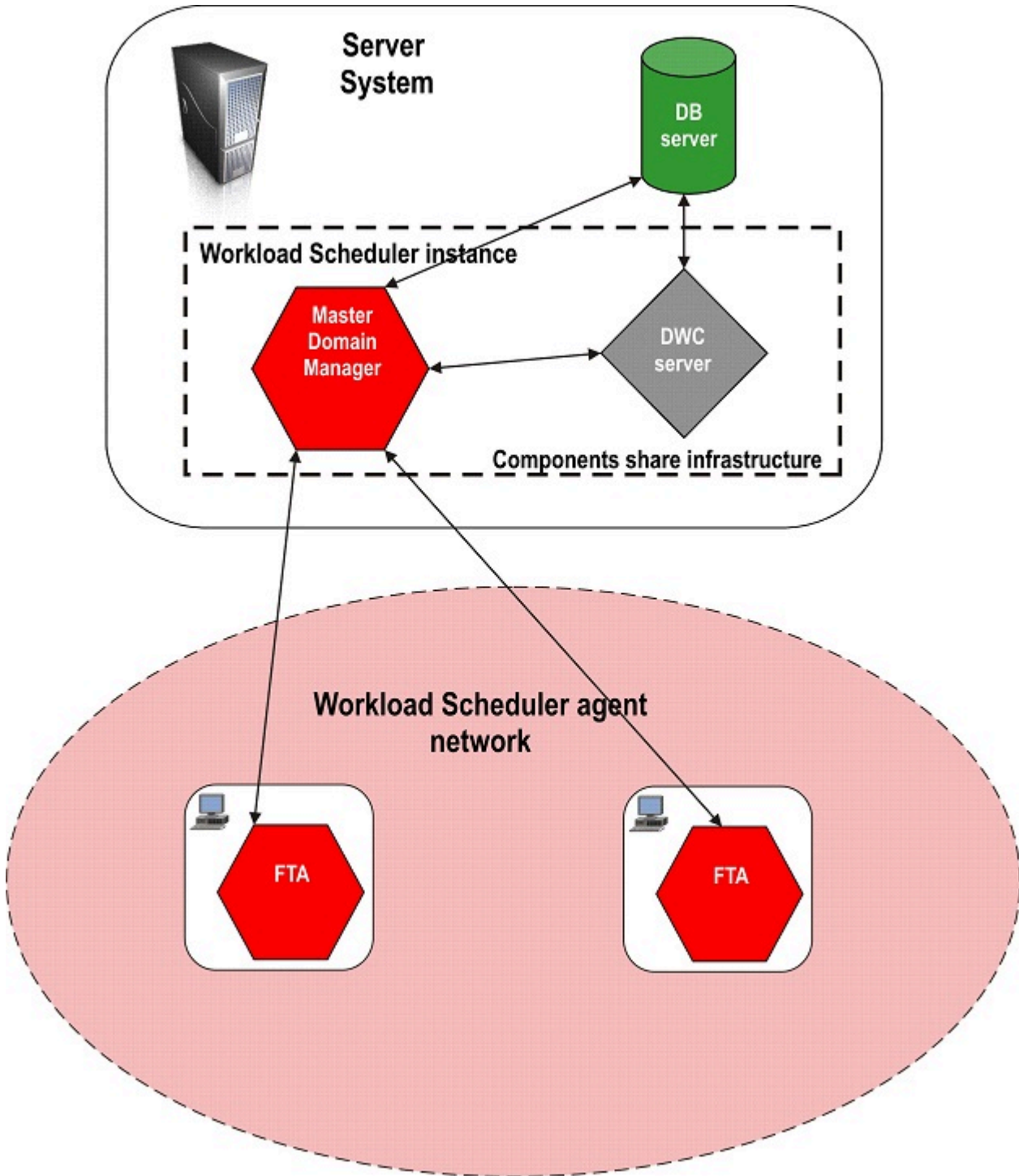
These typical scenarios for IBM Workload Automation show how to deploy specific solutions on the minimum possible system resources.

Distributed workload environment with static scheduling capabilities

Configuration to run workload statically across your distributed network.

Use this configuration to run workload statically across your distributed network. [Figure 3: Distributed workload environment with static scheduling capabilities on page 20](#) shows the system resources needed to install a fully-working IBM Workload Scheduler environment for managing your distributed workload.

Figure 3. Distributed workload environment with static scheduling capabilities



Distributed workload environment with dynamic scheduling capabilities

Use this configuration to run workload dynamically across your distributed network.

The run time environment is used to:

- Run on the agent job types with advanced options, both those supplied with the product and the additional types implemented through the custom plug-ins.
- Enable the capability to remotely run, from the agent, the dynamic workload broker resource command on the server.

For information about dynamic scheduling, how to run application job plug-ins and the dynamic workload broker resource command on the server, see the documentation in the previous release at [IBM Workload Automation 9.4.0](#) and browse to the **Scheduling Workload Dynamically** manual.

In this configuration, you can choose whether or not to add the run time environment for Java™ jobs to the agent.

[Figure 4: Distributed workload environment with dynamic scheduling capabilities on page 22](#) shows the system resources required to install a fully working IBM Workload Scheduler environment for running your distributed workload dynamically.



Note: A dynamic agent can be directly connected to its master domain manager or through a dynamic domain manager as shown in [Distributed workload environment with static and dynamic scheduling capabilities on page 23](#). In more complex network topologies where the master domain manager or the dynamic domain manager cannot directly communicate with the dynamic agent, you can configure your dynamic agents to use a local or remote gateway. For more information about the gateway parameters specified when installing a dynamic agent, see [Agent installation parameters - twsinst script on page 108](#). For more information about the gateway parameters specified when installing a dynamic agent, see [Agent installation parameters - twsinst script on page 108](#).


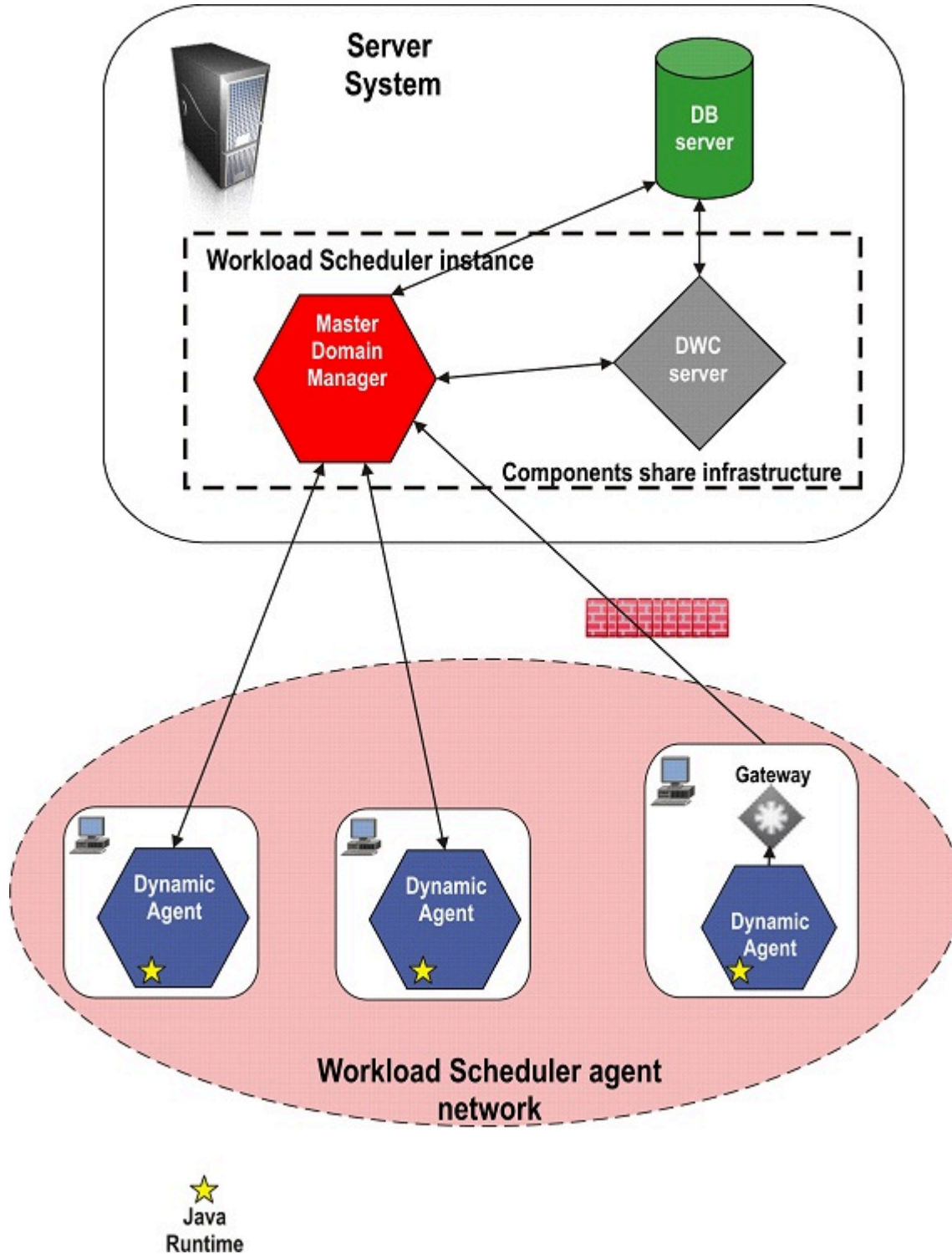

 For more information about gateway configuration, see the network communications information in the *Administration Guide*.

Figure 4. Distributed workload environment with dynamic scheduling capabilities



Dynamic scheduling supports most of the IBM Workload Scheduler features for static scheduling. The [Table 1: Features partially or not supported for dynamic scheduling on page 23](#) lists some features or properties that are partially or not supported.

Table 1. Features partially or not supported for dynamic scheduling

Feature	agent and IBM® Z Workload Scheduler agent
Event-driven workload automation.	<p><code>TivoliWorkloadSchedulerObjectMonitor</code> events supported.</p> <p><code>FileMonitor</code> events supported, except for IBM i systems.</p> <p><code>TivoliWorkloadSchedulerApplicationMonitor</code> events not supported.</p>
 Note: For more details about the events type, see <i>IBM Workload Scheduler User's Guide and Reference: Appendixes - Event-driven workload automation event and action definitions</i>	
Utility commands (datecalc, jobinfo, and so on).	Not supported.

Distributed workload environment with static and dynamic scheduling capabilities

Use this configuration to run workload both statically and dynamically across your distributed network.


The run time environment is used to:

- Run on the agent job types with advanced options, both those supplied with the product and the additional types implemented through the custom plug-ins.
- Enable the capability to remotely run, from the agent, the dynamic workload broker resource command on the server.

For information about dynamic scheduling, how to run application job plug-ins and the dynamic workload broker resource command on the server, see the documentation in the previous release at [IBM Workload Automation 9.4.0](#) and browse to the **Scheduling Workload Dynamically** manual.

In this configuration, you can choose whether or not to add the run time environment for Java™ jobs to the agent.

[Figure 5: Distributed workload environment with static and dynamic scheduling capabilities on page 24](#) shows the system resources required to install a fully working IBM Workload Scheduler environment for running your distributed workload both statically and dynamically. IBM Workload Scheduler requires a fault-tolerant agent and a dynamic agent to be installed on every system where jobs are to be scheduled statically or dynamically.

 **Note:** A dynamic agent can be directly connected to its master domain manager or through a dynamic domain manager as shown in [Figure 5: Distributed workload environment with static and dynamic scheduling capabilities on page 24](#). In more complex network topologies where the master domain manager or the dynamic domain manager cannot directly communicate with the dynamic agent, you can configure your dynamic agents to use a local or remote gateway. For more information about the gateway parameters specified when installing a dynamic agent, see [Agent installation parameters - twsinst script on page 108](#).


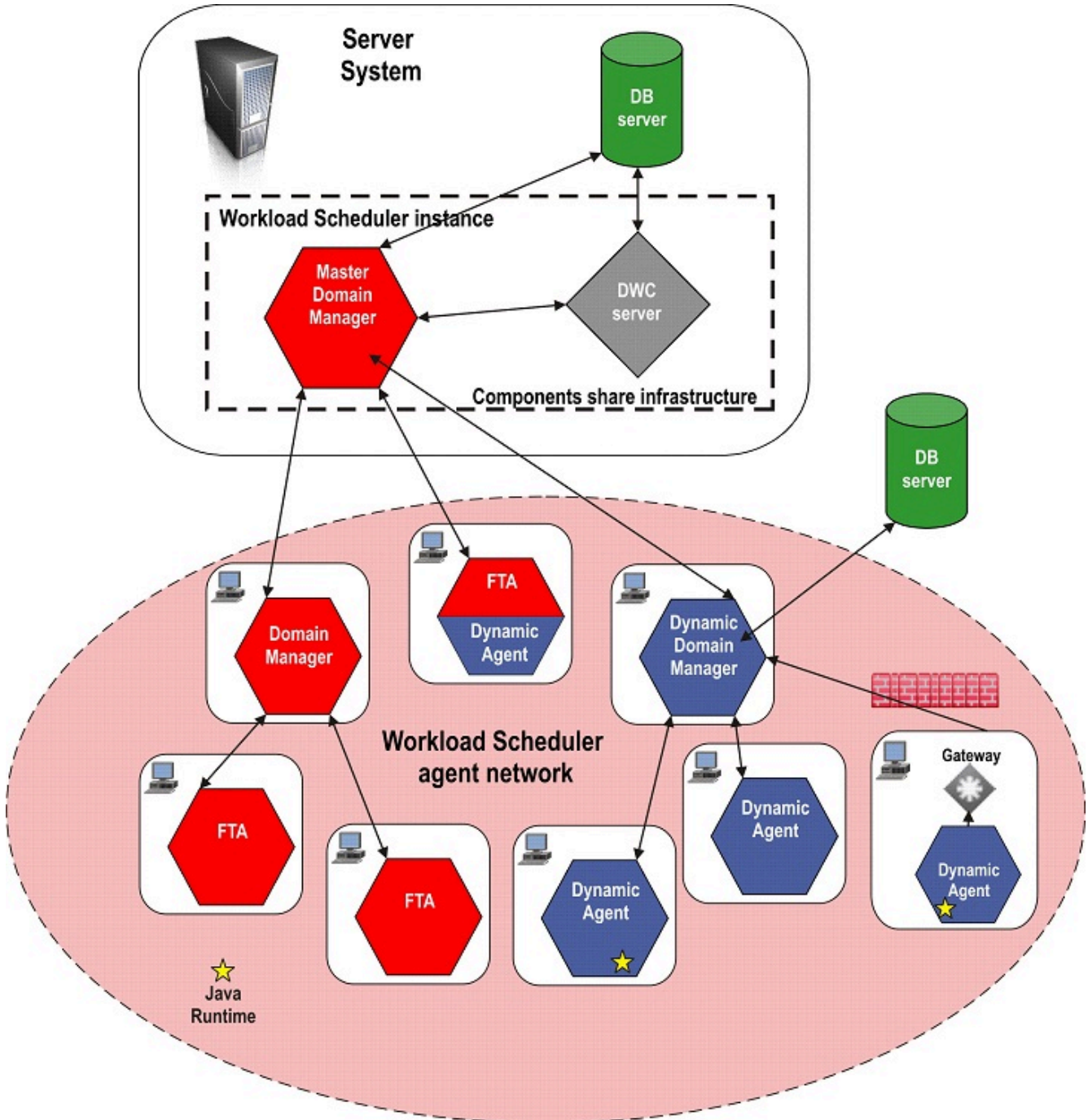
 For more information about gateway configuration, see the network communications information in the *Administration Guide*.

Figure 5. Distributed workload environment with static and dynamic scheduling capabilities



For a list of features partially or not supported in a mixed environment, see [Table 1: Features partially or not supported for dynamic scheduling on page 23](#).

End-to-end workload environment

In an End-to-end workload environment (agent connected to the z/OS® system), you can define the types of configurations.

You can define the following types of configurations:

To run your workload statically:

Using fault-tolerant agents

Use the fault-tolerant end-to-end scheduling environment to schedule and control static workload from the mainframe to distributed systems. On the distributed system, you install fault-tolerant agents and connect them to the z/OS® server. For details, see *Scheduling End-to-end with Fault Tolerance Capabilities*.

Using IBM Z Workload Scheduler Agents (z-centric)

Use the z-centric end-to-end scheduling environment to schedule and control static workload from the mainframe to distributed systems with a low cost of ownership. On the distributed system, you install IBM Z Workload Scheduler Agents and connect them to the z/OS® controller. For information about how to install the IBM Z Workload Scheduler Agent, see *IBM Z Workload Scheduler: Planning and Installation*. For information about how to use the IBM Z Workload Scheduler Agent, see *Scheduling End-to-end with z-centric Capabilities* for more details.

To run your workload dynamically:

Using IBM Z Workload Scheduler Agents (z-centric) with dynamic capabilities

Use the z-centric end-to-end scheduling environment to schedule and control dynamic workload from the mainframe to distributed systems with a low cost of ownership. On the distributed system, you install IBM Z Workload Scheduler Agents, add dynamic scheduling capabilities and connect them to a dynamic domain manager that must be connected to the z/OS® controller. For information about how to:

- Install a dynamic domain manager see [Installing dynamic domain components on page 128](#).
- Install IBM Z Workload Scheduler Agents, see *IBM Z Workload Scheduler: Planning and Installation*.
- Use IBM Z Workload Scheduler Agents, see *Scheduling End-to-end with z-centric Capabilities*.

Workload environment integrated with external systems

Configuration to extend IBM Workload Scheduler capabilities for scheduling on external applications.

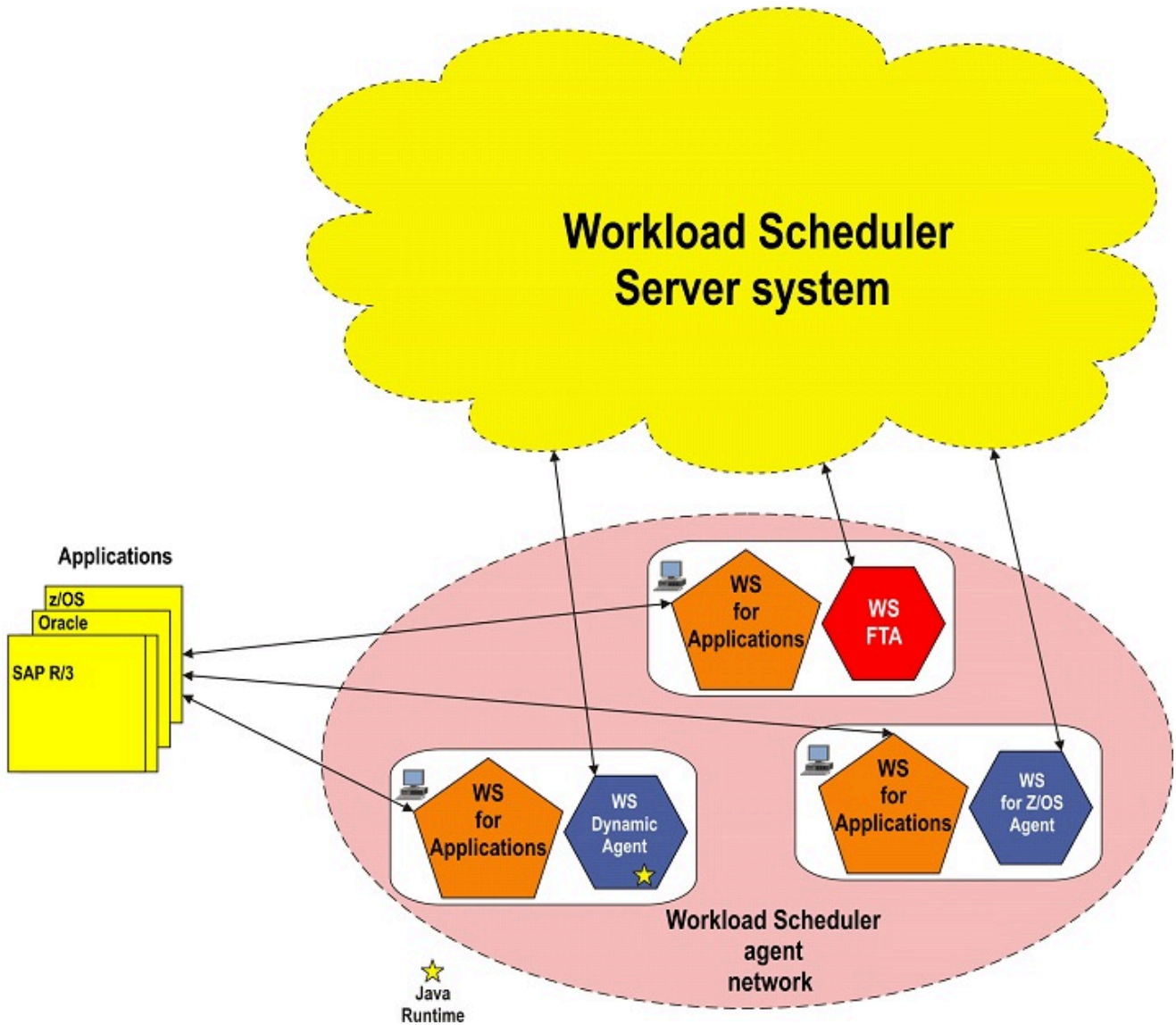
Use this configuration to extend IBM Workload Scheduler capabilities for scheduling on external applications, such as SAP and PeopleSoft using IBM Workload Scheduler.

[Figure 6: Workload environment integrated with external systems on page 26](#) shows a sample environment including the agents needed to extend IBM Workload Scheduler scheduling capabilities on one or more external applications using IBM

Workload Scheduler. You can install IBM Workload Scheduler on the master domain manager, on a fault-tolerant agents, on dynamic agents, and on IBM Z Workload Scheduler Agents.

For information about IBM Workload Scheduler, see the *IBM Workload Scheduler: User's Guide* documentation.

Figure 6. Workload environment integrated with external systems



Note: Installing IBM Workload Scheduler on an agent (master domain manager, domain manager, fault-tolerant agent, standard agent, dynamic agent, IBM Z Workload Scheduler Agent) is the correct deployment scenario in an end-to-end environment.

Distributed-driven workload environment for z/OS®

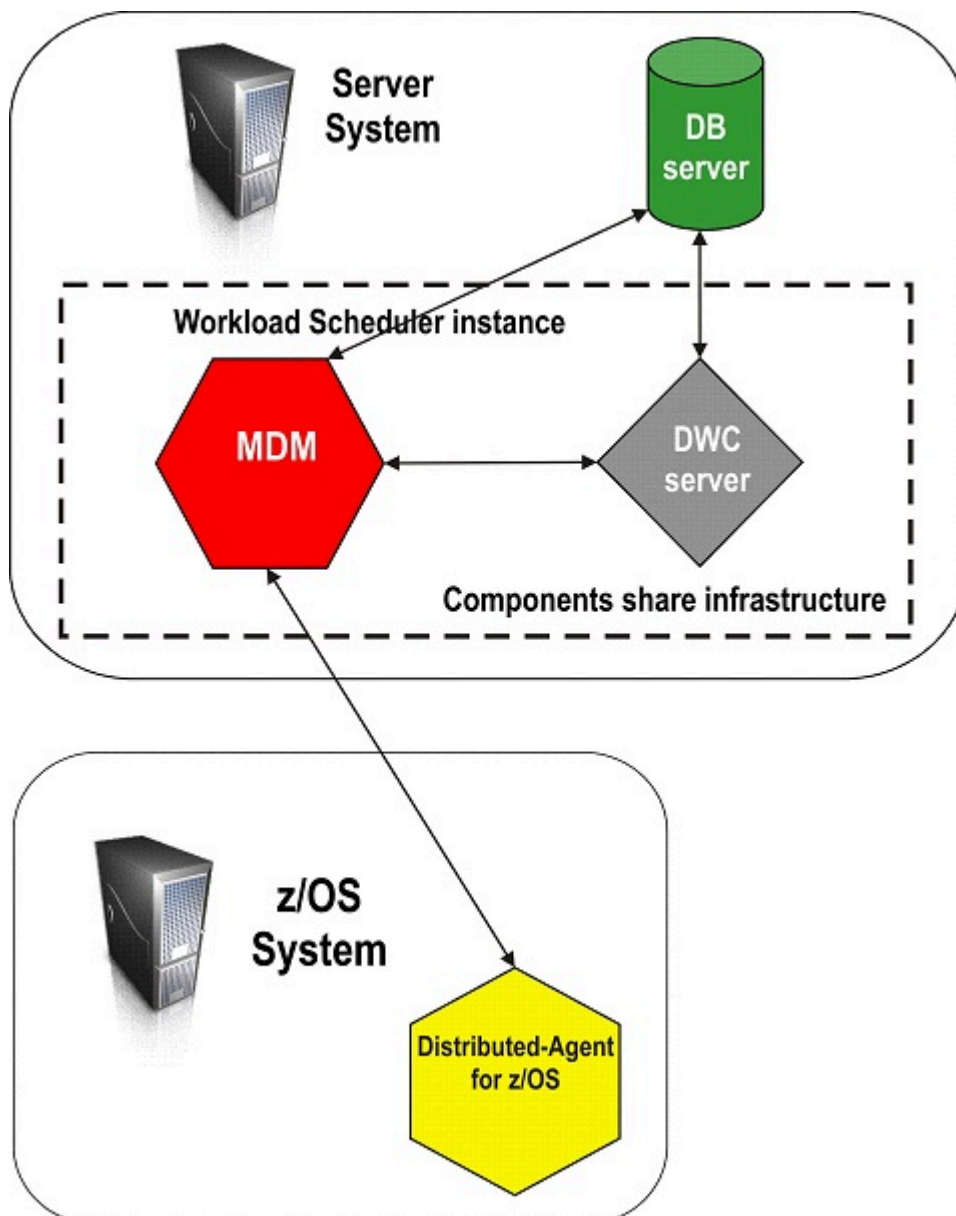
Configuration used when submitting from the IBM Workload Scheduler.

Use this configuration to submit from the IBM Workload Scheduler (using the dynamic workload broker component installed with the master domain manager or the dynamic domain manager) workload to be processed by JES2, without having to define the workload on the z/OS® system.

Figure 6: [Workload environment integrated with external systems on page 26](#) shows the minimum system resources needed to install a distributed-driven environment, where the IBM Workload Scheduler distributed-Agent for z/OS® represents a lightweight end-to-end scheduling solution where you define and manage on the distributed side the workload that is to be processed by JES2.

For information about IBM Workload Scheduler distributed-Agent for z/OS®, see the *IBM Workload Scheduler: Scheduling with the Agent for z/OS* documentation.

Figure 7. Distributed-driven workload environment for z/OS®



Dockerized environment

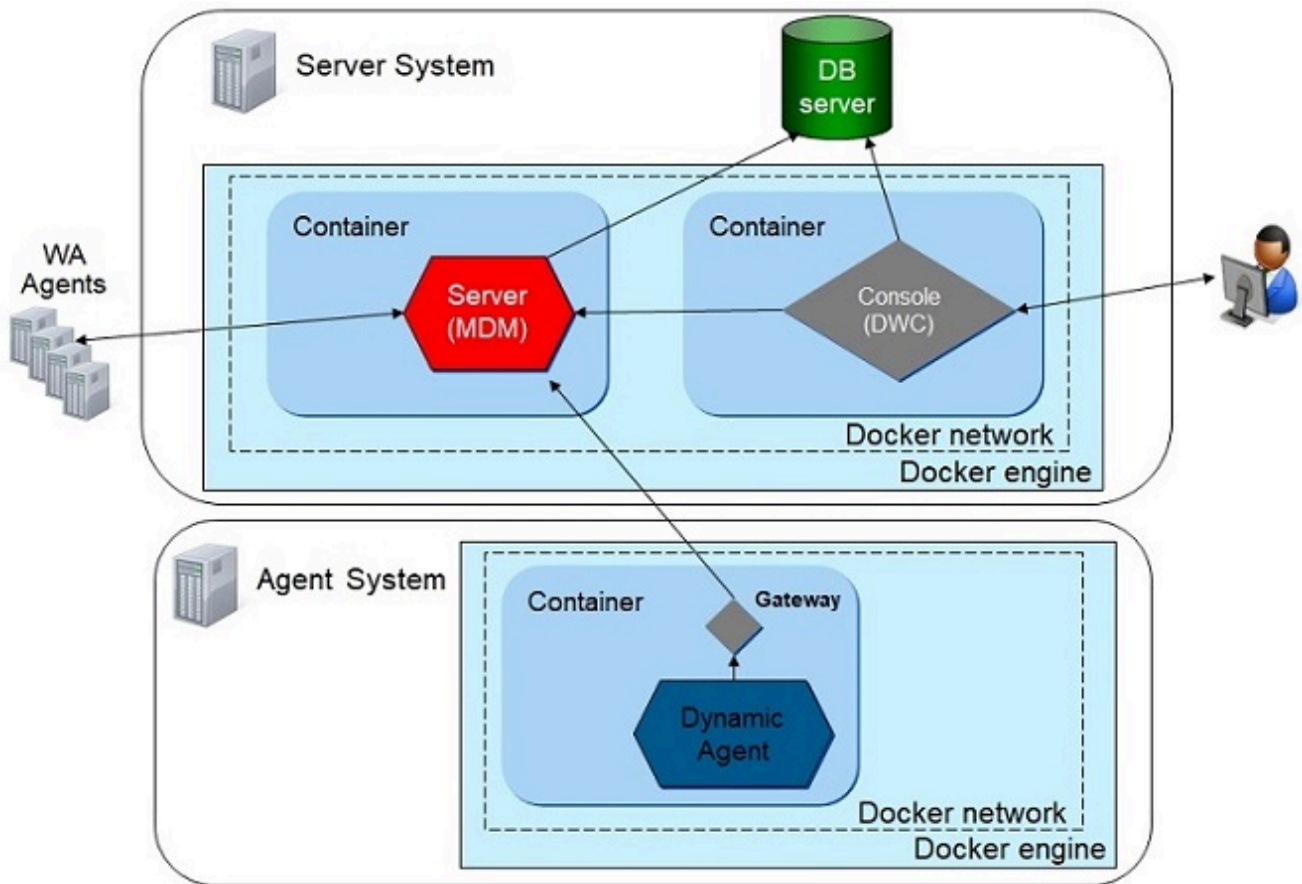
Use this configuration to implement a Dockerized environment.

Use this configuration to benefit of the IBM Workload Automation on a dockerized environment. Three containers are delivered and they can be deployed on the same engine or on different ones.

In the *Figure 1*, server and console components have been deployed on the same Docker engine and the dynamic agent component on a separated engine.

The database is always external to the Docker engine and a connection is established with server and console.

Figure 8. Dockerized environment configuration



Planning domains

A IBM Workload Scheduler network contains at least one master domain manager that acts as a management hub for the product. Additional domains can be used to divide a widely-distributed network into locally-managed groups of workstations.

In a single domain configuration, the master domain manager maintains communications with all of the workstations in the network.

In a multiple domain configuration, the master domain manager communicates with the workstations in its domain and all immediately subordinate domain managers. The subordinate domain managers communicate with the workstations in their domains and their immediately subordinate domain managers, and so on. Domain managers report all of the activities of the domain to the master. Using multiple domains reduces network traffic and the load on the master by reducing the number of direct communications between the master domain manager and workstations. Multiple domains also provide fault-tolerance by limiting the outage caused by losing a domain manager in a single domain. To limit the effects further, you can designate backup domain managers to take over if domain managers fail.

When you define a new domain, you must identify the parent domain and the domain manager. The parent domain is the domain directly above the new domain in the domain hierarchy. All communications to and from a domain are routed through the parent domain manager.

Localized processing in your domain

Localized processing is separating your scheduling needs based on a common set of characteristics, such as geographical locations, business functions, and application groupings.

Group related processing can limit the amount of interdependency information that needs to be communicated between domains. The benefits of localized domains are:

Decreased network traffic

Keeping processing localized to domains eliminates the need for frequent inter-domain communication.

Tighter security and simplified administration

Security and administration can be defined at and limited to the domain level. Instead of network-wide or workstation-specific administration, you can have domain administration.

Optimized network and workstation fault-tolerance

In a multiple domain network, you can define backups for each domain manager so that problems in one domain do not disrupt operations in other domains.

Considerations in planning domains

There are a number of considerations that are to be taken into account when planning domains.

In planning your IBM Workload Scheduler network, consider the following:

Number of workstations, applications, and jobs

Consider the number of workstations that comprise the network and the number of applications and jobs that the network runs. If you have a small number of workstations, or a small number of applications to control, you do not need multiple domains.

Number of geographic locations

Consider the number of geographic locations covered by your network and the reliability and efficiency of communication between the locations. Multiple geographic locations is one of the primary reasons

for choosing a multiple domain architecture. One domain for each geographical location is a common configuration. A single domain architecture relies on the network maintaining continuous processing.

Time zones

When your network is spread across multiple geographic locations in different time zones, decide whether to activate the time zone feature. See [Time zone considerations on page 35](#).

Centralized or decentralized management

You can manage single or multiple domain networks from a single master domain manager. If you want to manage multiple locations separately, you can consider the installation of a separate IBM Workload Scheduler network at each location. Some decentralized management is possible in a stand-alone IBM Workload Scheduler network by mounting or sharing file systems.

Types of applications

Consider the types of applications that are run by IBM Workload Scheduler. If you have multiple applications that are distinctly separate from each other, you might choose to put them in separate domains.

Windows™ network

When you have a Windows™ network, you might want your IBM Workload Scheduler domains to mirror your Windows™ domains.

System performance and other criteria

You can define multiple domains to localize systems based on performance or operating system type.

Amount of network traffic

If your network traffic is manageable, having multiple domains is less important.

Dependencies between jobs

Consider if you need to plan for job dependencies that cross system boundaries, geographical boundaries, or application boundaries. For example, does the start of Job1 on workstation1 depend on the completion of Job2 running on workstation2. The degree of interdependence between jobs is an important consideration when planning your network. If you use multiple domains, try to keep interdependent objects in the same domain to decrease network traffic and improve the use of the domain architecture. See *User's Guide and Reference*.

Level of fault-tolerance required

A disadvantage of the single domain configuration is the reliance on a single domain manager. In a multi-domain network, the loss of a single domain manager affects only the agents in its domain.

Firewalls

When your network contains firewalls, plan the structure of your domains around the firewalls. See *Administration Guide*.

Secure Sockets Layer (SSL) or IBM® Global Security Kit (GSKit) encryption

If you want to use SSL or GSKit encryption in your network, plan your domains in accordance with the protocol.



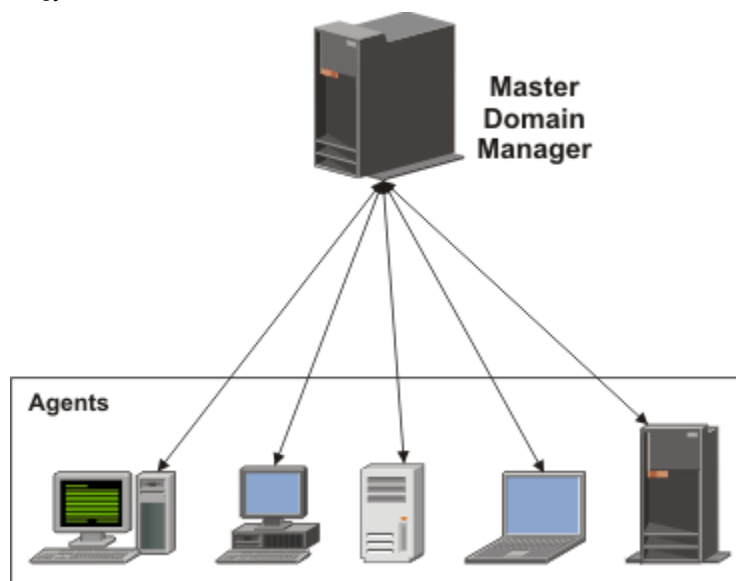
Note: If you want to be compliant with Federal Information Processing Standards (FIPS), you must use GSKit. See *Administration Guide*.

Single domain network

A single domain network consists of a master domain manager and any number of agents.

Figure 9: [Single domain topology on page 31](#) shows an example of a single domain network. A single domain network is well-suited to companies that have few locations and business functions. All communication in the network is routed through the master domain manager. With a single location, you are concerned only with the reliability of your local network and the amount of traffic it can handle.

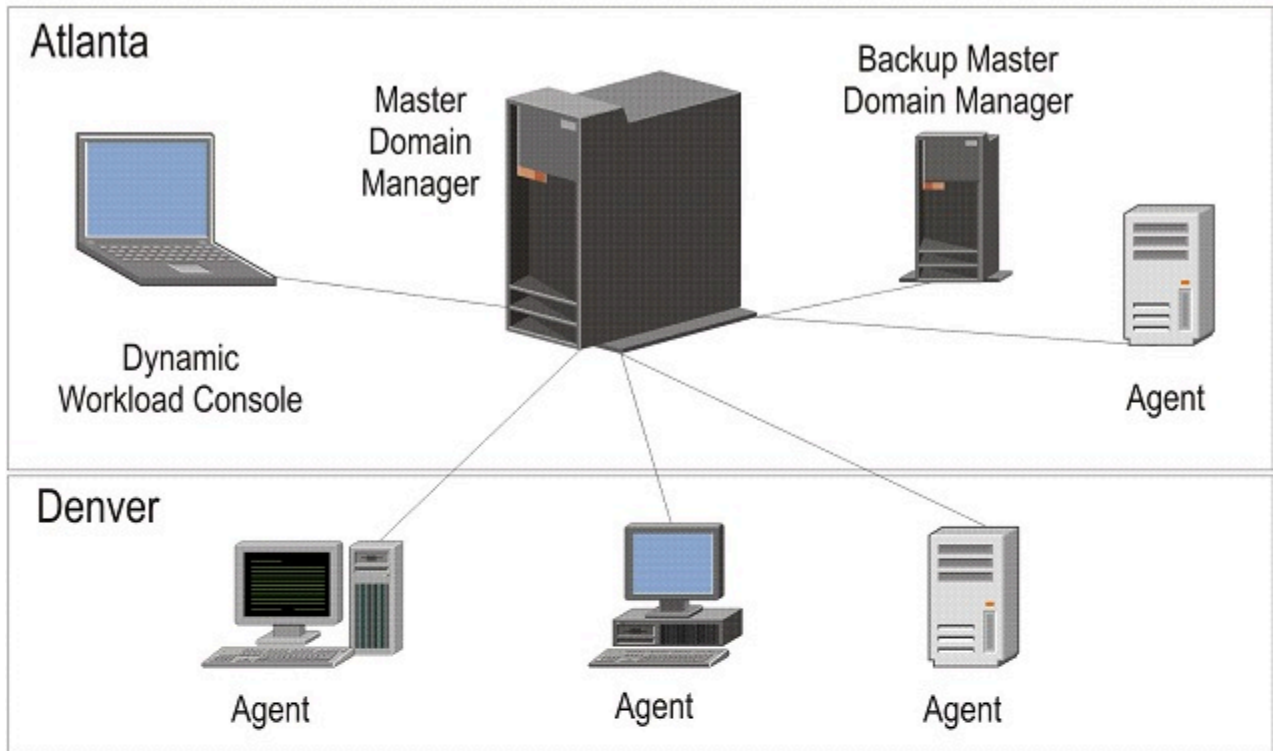
Figure 9. Single domain topology



Single domain networks can be combined with other networks, single or multiple domain, to meet multiple site requirements. IBM Workload Scheduler supports internetwork dependencies between jobs running on different networks.

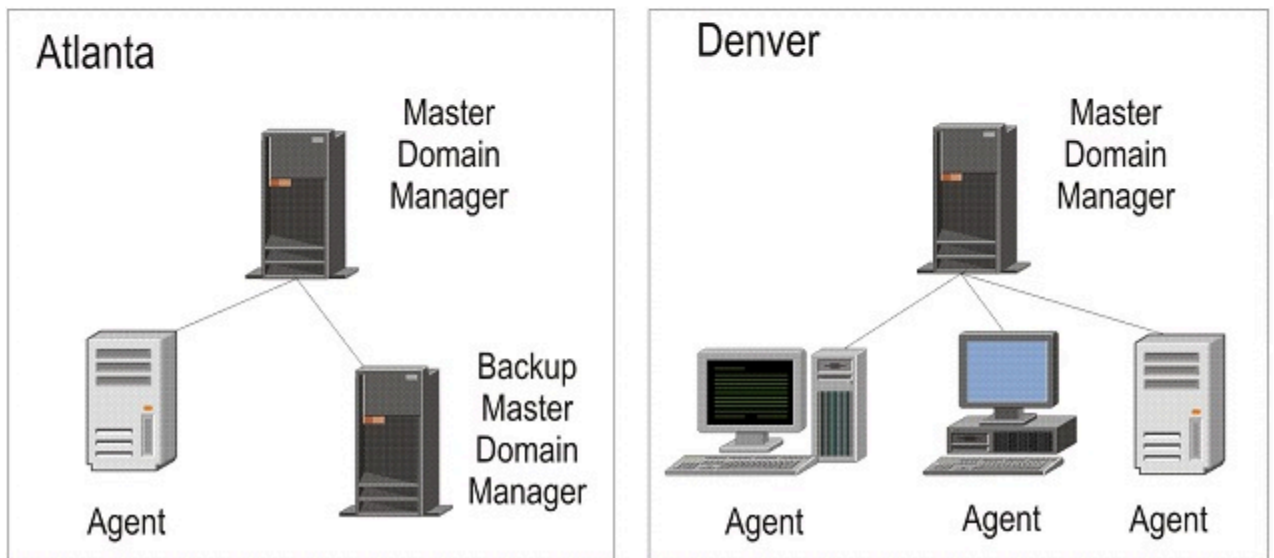
Figure 10. Single domain topology on multiple sites

Example 1



Or:

Example 2



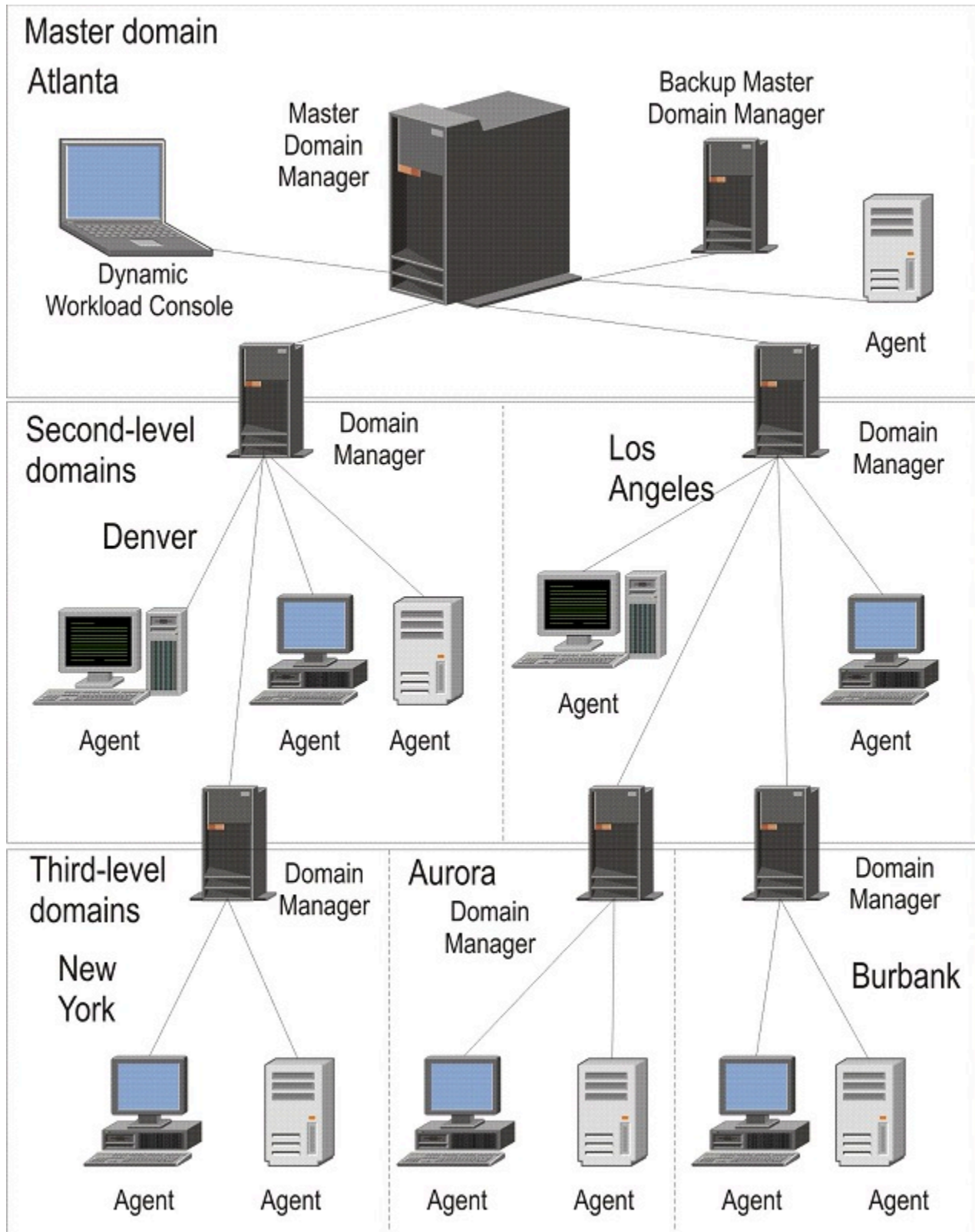
Example 1 shows a single domain network. The master domain manager is located in Atlanta, along with several agents. There are also agents located in Denver. The agents in Denver depend on the master domain manager in Atlanta to resolve all interagent dependencies, even though the dependencies might be on jobs that run in Denver. An alternative would be to create separate single domain networks in Atlanta and Denver, as shown in example 2.

Multiple domain network

Multiple domain networks are especially suited to companies that span multiple locations, departments, or business functions.

A multiple domain network consists of a master domain manager, any number of lower tier domain managers, and any number of agents in each domain. Agents communicate only with their domain managers, and domain managers communicate with their parent domain managers. The hierarchy of domains can go down to any number of levels.

Figure 11. Multiple domain topology



As [Figure 11: Multiple domain topology on page 34](#) illustrates, the master domain manager is located in Atlanta. The master domain manager contains the database files used to document the scheduling objects, and distributes the Symphony file to its agents and the domain managers in Denver and Los Angeles. The Denver and Los Angeles domain managers then distribute the Symphony file to their agents and subordinate domain managers in New York, Aurora, and Burbank. The master domain manager in Atlanta is responsible for broadcasting inter-domain information throughout the network.

All communication to and from the New York domain manager is routed through its parent domain manager in Denver. If there are schedules or jobs in the New York domain that are dependent on schedules or jobs in the Aurora domain, those dependencies are resolved by the Denver domain manager. Most inter-agent dependencies are handled locally by the lower tier domain managers, greatly reducing traffic on the network.

Workstation classes

Workstations are organized into domains to make your network management easier and more efficient. However, the domain name is not one of the selection criteria when choosing where to run a job or job stream.

If you want to group workstations together because they have similar job scheduling characteristics, use a workstation class. Any number of workstations can be grouped in a class, and a workstation can be in many classes. Jobs and job streams can be assigned to run on a specific workstation class.

For example, you could set up workstation classes to group workstations according to:

- Your internal departmental structure, so that you could define a job that would be run on all the workstations in a department
- The software installed on them, so that you could define a job that would be run on all the workstations that had a particular application installed
- The role of the user, so that you could define a job that would be run on all the workstations belonging to, for example, managers

In this example, an individual workstation could be in one workstation class for its department, another for its user, and several others for the software installed on it.

Time zone considerations

Time zone support is an optional feature that is enabled by default.

It allows you to manage workloads at a global level. Time zone implementation also enables easy scheduling across multiple time zones.

For a description of how the time zone implementation works, see *User's Guide and Reference* .

For information about how to set the time zone implementation, see *IBM Workload Scheduler: Administration Guide*.

Chapter 2. Installation considerations

Some considerations that need to be taken into account before installation.

About this task

Before you begin the installation using the installation wizard, consider the following items that might apply to your specific environment.

Installing on Windows™ operating systems

If you are installing on Windows™, consider the following items.

- If you are using Windows™ Terminal Services, set the install user with the command: `change user / install`
- If TWS_USER is a domain user, Microsoft™ Computer Browser Service must be active.
- If TWS_USER is a domain user, the user performing the installation must be a domain administrator.

Remote installation

You cannot install IBM Workload Scheduler on a Windows™ workstation from a remote Samba-mounted file system.

Installing for end-to-end scheduling

If you are installing IBM Workload Scheduler on a workstation used as a distributed agent (that is either a standard agent, fault-tolerant agent, or domain manager) for end-to-end scheduling, specify OPCMASTER as the name of the master domain manager during the installation process. For further information about installing for end-to-end scheduling, see *Scheduling End-to-end with Fault Tolerance Capabilities*.

Create symbolic links

UNIX™ and Linux™. The installation wizard installs all executable files in its own `.bin` directory. Before running any IBM Workload Scheduler commands, you run a script that sets the command-line environment to access these files. To avoid having to set the environment each time you want to run any of the commands from within a script, you can select an installation option to create symbolic links to those commands or utilities most frequently used from within scripts. [Table 2: Symbolic link options on page 36](#) shows the binary paths and the symbolic links.

Table 2. Symbolic link options

TWS binary path	Symbolic link
<code>TWS_home/bin/at</code>	<code>usr/bin/mat</code>
<code>TWS_home/bin/batch</code>	<code>usr/bin/mbatch</code>
<code>TWS_home/bin/datecalc</code>	<code>usr/bin/datecalc</code>
<code>TWS_home/bin/jobstdl</code>	<code>usr/bin/jobstdl</code>

Table 2. Symbolic link options (continued)

TWS binary path	Symbolic link
<i>TWS_home/bin/maestro</i>	usr/bin/maestro
<i>TWS_home/bin/mdemon</i>	usr/bin/mdemon
<i>TWS_home/bin/morestdl</i>	usr/bin/morestdl
<i>TWS_home/bin/muser</i>	usr/bin/muser
<i>TWS_home/bin/parms</i>	usr/bin/parms

Installation paths

IBM Workload Automation is the name of a family of products and components, which includes the following:

- IBM Workload Scheduler
- IBM® Z Workload Scheduler
- IBM Workload Scheduler for Applications
- Dynamic Workload Console

Many IBM Workload Scheduler components are installed in what is called an *IBM Workload Automation instance*.

This section describes the installation paths of the IBM Workload Scheduler components:

***TWA_home* installation path**

Many of the components are installed in an IBM Workload Automation instance. Although this is a notional structure it is represented on the computer where you install IBM Workload Automation components by a common directory referred to in the documentation as *TWA_home*. The path of this directory is determined when you install an IBM Workload Scheduler component for the first time on a computer. You have the opportunity to choose the path when you make that first-time installation, but if you accept the default path, it is as follows:

On UNIX™ operating systems

```
/opt/wa/server_<wuser><n>
```

On Windows™ operating systems

```
%Program Files%\wa\server<n>
```

where *<n>* is an integer value ranging from 0 for the first instance installed, 1 for the second, and so on.

This path is called, in the publications, *TWA_home*. For details about the directories created outside of *TWA_home*, see the section about directories created outside of *TWA_home* in *Planning and Installation Guide*.

***TWA_DATA_DIR* and *DWC_DATA_dir* configuration directories**

To simplify administration, configuration, and backup and recovery on UNIX systems, a new default behavior has been implemented with regard to the storage of product data and data generated by IBM® Workload Scheduler, such as logs and configuration information. These files are now stored by default in the `<data_dir>` directory, which you can optionally customize at installation time.

By default, this directory is `TWA_home/TWSDATA` for the server and agent components, and `DWC_home/DWC_DATA` for the Dynamic Workload Console. The product binaries are stored instead, in the installation directory.

You can optionally customize the `<data_dir>` directory at installation time by setting the `--data_dir` argument when you install using the command-line installation. If you want to maintain the previous behavior, you can set the `--data_dir` argument to the IBM® Workload Scheduler installation directory.

If you deploy the product components using Docker containers, the `<data_dir>` is set to the default directory name and location, and it cannot be modified.

To retrieve the `TWA_DATA_DIR` and `DWC_DATA_dir` location in case you have modified the default path, check the values for the `TWS_datadir` and `DWC_datadir` properties stored in the `twainstance<instance_number>.TWA.properties` file. The file is located in `/etc/TWA`.

Alternatively, you can also proceed as follows:

1. Browse to `<TWA_home>/TWS` path.
2. Source the `./tws_env.sh` shell script.
3. Type `echo $UNISONWORK`. As a result, the path to the `TWA_DATA_DIR` is returned.

IBM Workload Scheduler installation path

You can install more than one IBM Workload Scheduler component (master domain manager, backup master domain manager, domain manager, or backup domain manager) on a system, but each is installed in a separate instance of IBM Workload Automation, as described above.

The installation path of IBM Workload Scheduler is:

```
<TWA_home>/TWS
```

***DWC_home* installation path**

The Dynamic Workload Console can be installed in the path of your choice, but the default installation path is as follows:

On Windows™ operating systems

```
%ProgramFiles%\wa\DWC
```

On UNIX™ operating systems

```
/opt/wa/DWC
```

On z/OS operating system

```
/opt/wa/DWC
```

IBM Workload Scheduler agent installation path

The agent also uses the same default path structure, but has its own separate installation directory:

```
<TWA_home>/TWS/ITA/cpa
```



Note: The agent also installs some files outside this path. If you have to share, map, or copy the agent files (for example when configuring support for clustering) share, map, or copy these files, as well:

On UNIX™ operating systems

```
/etc/teb/teb_tws_cpa_agent_<tws_user>.ini
/opt/IBM/CAP/EMICPA_default.xml
/etc/init.d/tebctl-tws_cpa_agent_<tws_user>
  (on Linux and Solaris)
/etc/rc.d/init.d/tebctl-tws_cpa_agent_<tws_user>
  (on AIX)
/sbin/init.d/tebctl-tws_cpa_agent_<tws_user>
  (on HP-UX)
```

On Windows™ operating systems

```
%windir%\teb\teb_tws_cpa_agent_<tws_user>.ini
%ALLUSERSPROFILE%\IBM\CAP\EMICPA_default.xml
```

The agent uses the following configuration files which you might need to modify:

JobManager.ini

This file contains the parameters that tell the agent how to run jobs. You should only change the parameters if advised to do so in the IBM Workload Scheduler documentation or requested to do so by IBM Software Support. Its path is:

On UNIX™ operating systems

```
TWA_DATA_DIR/ITA/cpa/config/JobManager.ini
```

On Windows™ operating systems

```
TWA_home\TWS\ITA\cpa\config\JobManager.ini
```

JobManagerGW.ini

When a dynamic agent is installed and **-gateway** `local|remote` is specified, then this file contains the same parameters as the `JobManager.ini` file except for the following differences:

- The **ResourceAdvisorUrl** parameter points to the dynamic workload broker, and not the master domain manager.

The `JobManagerGW.ini` file is installed in the following location:

On UNIX™ operating systems

`TWA_DATA_DIR/ITA/cpa/config/JobManagerGW.ini`

On Windows™ operating systems

`TWA_home\TWS\ITA\cpa\config\JobManagerGW.ini`

ita.ini

This file contains parameters which determine how the agent behaves. Changing these parameters may compromise the agent functionality and require it to be reinstalled. You should only change the parameters if advised to do so in the IBM Workload Scheduler documentation or requested to do so by IBM Software Support. Its path is:

On UNIX™ operating systems

`TWA_DATA_DIR/ITA/cpa/ita/ita.ini`

On Windows™ operating systems

`TWA_home\TWS\ITA\cpa\config\ita.ini`

Installation path for files giving the dynamic scheduling capability

The files that give the dynamic scheduling capability are installed in the following path:

`<TWA_home>/TDWB`

The command line client installation path

The command line client is installed outside all *IBM Workload Automation instances*. Its default path is:

`TWA_home/TWS/CLI`

However, the information above supplies only the **default** paths. To determine the actual paths of products and components installed in IBM Workload Automation instances, see [Finding out what has been installed in which IBM Workload Automation instances on page 40](#)

Finding out what has been installed in which IBM Workload Automation instances

About this task

If you are not the installer of IBM Workload Scheduler and its components, you might not know what components have been installed, and in which instances of IBM Workload Automation. Follow this procedure to find out:

1. Access the following directory:

UNIX™ and Linux™ operating systems

`/etc/TWA`

Windows™ operating systems

`%windir%\TWA`

- List the contents of the directory. Each IBM Workload Automation instance is represented by a file called:

`twainstance<instance_number>.TWA.properties`. These files are deleted when all the products or components in an instance are uninstalled, so the number of files present indicates the number of valid instances currently in use.

- Open a file in a text viewer.



Attention: Do not edit the contents of this file, unless directed to do so by IBM Software Support. Doing so might invalidate your IBM Workload Scheduler environment.

The contents are similar to this on a master domain manager :

```
#TWAInstance registry
#Tue Feb 26 09:28:08 EST 2019
TWA_path=/opt/wa/server_twsuser
TWA_componentList=TWS
TWS_version=9.5.0.00
TWS_counter=1
TWS_instance_type=MDM
TWS_basePath=/opt/wa/server_twsuser/TWS
TWS_user_name=twsuser
TWS_wlpdir=/opt/wa/wlpEngine/wlp
TWS_datadir=/opt/wa/server_twsuser/TWSDATA
TWS_jdbcdir=/opt/wa/server_twsuser/TWS/jdbcdrivers/db2
```

The contents are similar to this on the Dynamic Workload Console:

```
#TWAInstance registry
#Tue Feb 26 09:42:10 EST 2019
TWA_path=/opt/wa/DWC
TWA_componentList=DWC
DWC_version=9.5.0.00
DWC_counter=1
DWC_instance_type=DWC
DWC_basePath=/opt/wa/DWC
DWC_user_name=dwadmin
DWC_wlpdir=/opt/wa/wlpDWC/wlp
DWC_datadir=/opt/wa/DWC/DWC_DATA
DWC_jdbcdir=/opt/wa/DWC/jdbcdrivers/derby
```

The important keys to interpret in this file are:

TWA_path

This is the base path, to which the installation added one or more of the following directories, depending on what was installed:

TWS

Where the IBM Workload Scheduler component is installed

DWC

Where the Dynamic Workload Console is installed

ssm

Where the Netcool® SSM monitoring agent is installed (used in event management)

TWA_componentList

Lists the components installed in the instance of IBM Workload Automation.

TWS_counter

Indicates if an IBM Workload Scheduler component is installed in this instance of IBM Workload Automation (when the value=1).

TWS_instance_type

Indicates which component of IBM Workload Scheduler is installed in this instance:

MDM

Master domain manager

BKM

Backup master domain manager

DDM

dynamic domain manager

FTA

Fault-tolerant agent or domain manager

TWS_user_name

The ID of the <<TWS_user>> of the IBM Workload Scheduler component.

TWS_wlmdir

The installation directory of the WebSphere Application Server Liberty Base instance used by IBM Workload Scheduler.

TWS_datadir

The directory containing product data and data generated by IBM Workload Scheduler, such as logs and configuration information.

DWC_counter

Indicates if an instance of Dynamic Workload Console is installed in this instance of IBM Workload Automation (when the value=1)

DWC_user_name

The ID of the Dynamic Workload Console user.

DWC_wlmdir

The installation directory of the WebSphere Application Server Liberty Base instance used by Dynamic Workload Console.

DWC_datadir

The directory containing product data and data generated by Dynamic Workload Console, such as logs and configuration information.

Directories created outside of *TWA_home* at installation time

The following list shows the directories that are created outside of *TWA_home* when you install IBM Workload Scheduler.

Windows operating systems

```
%WINDIR%\TWA

%WINDIR%\system32\TWSRegistry.dat (32 bits)
%WINDIR%\syswow64\TWSRegistry.dat (32 bits on 64 bits)
%WINDIR%\TWSRegistry.dat (64 bits on 64 bits)
%WINDIR%\teb
%WINDIR%\cit
%ProgramFiles%\tivoli\cit (or the path specified by %WINDIR%\cit\cit.ini)
```

UNIX

```
/etc/TWA
/etc/TWS
/etc/teb
/etc/cit
/etc/init.d/tebclt-tws_cpa_agent_instance_name
/usr/Tivoli/TWS
/usr/ibm/tivoli/common/CIT/logs
/opt/tivoli/cit (or the path specified by /etc/tivoli/cit/cit.ini)
```

Windows™ services

When installing on the Windows™ operating system the Windows™ Service Control Manager registers services.

About this task

An installation on Windows™ operating systems registers the following services on the Windows™ Service Control Manager:

- IBMIBM Workload Scheduler (for *TWS_user*)
- Netman (for *TWS_user*)
- Token Service (for *TWS_user*) - includes the In-Flight Tracing facility service
- IBM Workload Scheduler SSM Agent (for *TWS_user*)
- IBM Common Platform Agent: *tws_cpa_agent_* (for *TWS_user*)



Note: An existing service that has the same name as the new service will be overwritten during installation.

The Service Control Manager maintains its own user password database. If the *TWS_user* password is changed after installation, you must use the Services applet in the Control Panel to assign the new password for the Token Service and IBM Workload Scheduler (for *TWS_user*). For more information, see the section about changing the password of the *TWS_User* in *IBM Workload Scheduler: Administration Guide*.

Part II. Installing IBM® Workload Scheduler

Available installation methods

About this task

deploy, scale up, scale down

This section provides the information required before you install the product. The available installation methods are listed, together with some considerations:

Advantages of the command-line installation

The command-line installation is a very simple procedure, which supports installing all components (master domain manager, backup domain manager, dynamic domain manager, backup dynamic domain manager, Dynamic Workload Console, and agents) using dedicated commands. You can choose to maintain the default values already defined in the properties file, specify all or part of the parameters in the command line when typing the command, or edit all or part of the parameters stored in the properties file. To proceed with the command-line installation, skip to [Installing from the CLI on page 47](#).

Advantages of the Docker deployment

The Docker installation is comprised of a set of pre-installed images for the master domain manager, the Dynamic Workload Console, and the DB2 database. All you have to do is launch the Docker installation commands.

Docker is a state-of-the-art technology which creates, deploys, and runs applications by using containers. Packages are provided containing an application with all of the components it requires, such as libraries, specific configurations, and other dependencies, and deploy it in no time on any other Linux or Windows workstation, regardless of any different settings between the source and the target workstation.

Docker adoption ensures standardization of your workload scheduling environment and provides an easy method to replicate environments quickly in development, build, test, and production environments, speeding up the time it takes to get from build to production significantly. Install your environment using Docker to improve scalability, portability, and efficiency.

To proceed with the Docker installation, skip to [Deploying containers with Docker on page 154](#).

Advantages of the Red Hat OpenShift deployment

The IBM Workload Automation product components can be deployed onto Red Hat OpenShift, V4.x. You can deploy IBM Workload Automation components using IBM® certified containers on a Kubernetes-based container application platform useful to orchestrate containerized applications. Deploy the IBM Workload Automation Operator on your Red Hat OpenShift cluster first, and then use the Operator to install the IBM Workload Automation components: the IBM Workload Automation server (master domain manager), Dynamic Workload Console, and the dynamic agent. IBM® certified containers are provided for the operator and for each of the product components. You can then manage the IBM Workload Automation containers from the OpenShift dashboard or from the command line interface.

The IBM Workload Automation agent container can be deployed onto OpenShift, V3.x, a Kubernetes-based container application platform useful to orchestrate containerized applications. By using OpenShift, you can deploy the IBM Workload Automation agent container with a *template.yml* file to quickly configure and run it as Docker container application in a Kubernetes cluster. You can then manage the IBM Workload Automation agent container from the OpenShift dashboard or from the command line interface.

With OpenShift, you can implement distributed, advanced and scalable services based on the Docker container technology and orchestrated by Kubernetes. For more information, see [Deploying IBM Workload Automation components on Red Hat OpenShift on page 157](#).

Advantages of deploying on Amazon EKS

To respond to the growing request to make automation opportunities more accessible, IBM® Workload Scheduler is now offered on the Amazon Web Services cloud. Within just a few minutes, you can access the product Helm chart and container images and easily launch an instance to deploy an IBM® Workload Scheduler server, console, and agents with full on-premises capabilities on AWS. IBM® Workload Scheduler on AWS improves flexibility and scalability of your automation environment. It helps in lowering costs and eliminating complexity, while reducing the operational overhead and the burden involved in managing your own infrastructure, so you can invest your time and resources in growing your business. Also, IBM® Workload Scheduler on AWS delivers faster access to managed services solutions, for a full product lifecycle management.

For more information see [Deploying on Amazon EKS on page 159](#).

Advantages of deploying on Azure Kubernetes Service (AKS)

You can use Azure AKS to deploy, scale up, scale down and manage containers in the cluster environment. Use the IBM® Workload Scheduler Helm chart and container images to deploy the server, console and dynamic agent to the Azure AKS public cloud. Azure AKS gives you access to helpful services. For example, you can use the Azure SQL database, a highly scalable cloud database service. See [Deploying on Azure AKS on page 159](#) for more details.

Advantages of deploying on Google GKE

Google Kubernetes Engine (GKE) provides a managed environment for deploying, managing, and scaling your containerized applications using Google infrastructure. The Google GKE environment consists of multiple machines grouped together to form a cluster. You can also deploy and run Google Cloud SQL for SQL server.

Google GKE supports session affinity in a load balancing cluster, a feature which maintains each user session always active on the same pod. This ensures that the Dynamic Workload Console always connects to the same server during a session and that the user can perform any number of operations smoothly and seamlessly.

For more information, see [Deploying on Google GKE on page 160](#).

Advantages of the installation on IBM Cloud Private

The IBM Workload Automation Server, IBM Workload Automation Console, and IBM Workload Automation Agent components can be deployed into IBM® Cloud Private, an application platform for developing and managing on-premises, containerized applications.

IBM® Cloud Private provides an integrated environment for managing containers that includes the container orchestrator Kubernetes, a private image repository, a management console, and monitoring frameworks. With IBM® Cloud Private, you can deploy the IBM Workload Automation components as Helm charts to quickly configure and run them as Docker container applications in a Kubernetes cluster. You can then manage the IBM Workload Automation components from the IBM® Cloud Private dashboard or from the command-line interface.

To proceed with the IBM® Cloud Private installation, skip to [Deploying IBM Workload Automation in IBM Cloud Private on page 160](#).

Chapter 3. Installing from the CLI

Install, upgrade and uninstall IBM Workload Scheduler from the command-line interface.

Downloading installation images

Steps to take when downloading images on your workstation.

About this task

To perform a fresh install at the latest product version, download the installation images from [IBM Fix Central](#).

1. Ensure that your workstation has sufficient space to store the compressed file containing the installation images. For more information about system requirements, see [IBM Workload Scheduler Detailed System Requirements](#).
2. From [IBM Fix Central](#), download the compressed file, containing the latest fix pack image, to a temporary directory.
3. Extract the installation image from the downloaded file and verify that the installation image is complete. Extract the content of the ZIP files into a directory, using one of the extraction tools available on your system or that can be downloaded from the internet. The tool you use must be able to keep the file permissions on the extracted files, for example, `infozip`.

On Windows™ systems, ensure that you extract the image into a path that is not very long, otherwise, the file name might be truncated. The maximum length allowed is 255 characters.

If you are installing on a UNIX™ operating system, run the following command:

```
chmod -R 755 <imagesDir>
```



Note: To extract the `.zip` file onto a Windows™ 64-bit system, ensure that the image is not located on the desktop because the Windows™ operating system extract tool might encounter a problem. Choose another directory into which to extract the Fix Pack image.

On z/OS systems, perform the following steps:

- a. Transfer the `9.5.0-IBM-DWC-Zsystem-FP000n.pax` file using the FTP protocol in binary to your USS environment.
- b. Restore the code by issuing the following command:

```
pax -rf 9.5.0-IBM-DWC-Zsystem-FP000n.pax
```

where *n* is the number of the Fix Pack you are installing.



Note: DB2 is available for download from [IBM Passport Advantage](#) only. The latest versions of WebSphere Application Server Liberty Base can be downloaded from [Recommended updates for WebSphere Application Server Liberty](#). For further details, see the Download Document at [IBM Workload Scheduler download document](#) and Fix Pack readmes.

Prerequisites

When installing an IBM® Workload Scheduler components, consider the following prerequisites.

To produce a dynamic report that lists the supported operating systems, click [Supported operating systems](#).

For a complete list of system requirements (disk spaces, temporary spaces and RAM usage), see [IBM Workload Scheduler Detailed System Requirements](#).

WebSphere Application Server Liberty Base

The latest versions of WebSphere Application Server Liberty Base can be downloaded from [Recommended updates for WebSphere Application Server Liberty](#). For further details, see the Download Document at [IBM Workload Scheduler download document](#) and Fix Pack readmes.

Before you install IBM Workload Scheduler for the first time, you must have one of the following databases installed. The following requirements apply to the RDBMS systems:

DB2

DB2® Enterprise Server Edition

A version of DB2® is bundled with the installation image. You can install DB2® Server and the master domain manager or Dynamic Workload Console on the same workstation, then configure the database drivers from any workstation in your environment.

You can install DB2® manually.

To install DB2® manually, run the DB2 server or client installation program on the product image. The setup files for DB2® are on the product images as follows:

Table 3. DB2® Setup files

Operating System	Setup file
AIX®, HP-UX/IA64, SunOS/SPARC, SunOS/SPARC64, all Linux™ operating systems	DB2/server/db2setup
SunOS/AMD64	DB2/wse/db2setup
Windows/x86 and Windows/AMD64	DB2\SERVER\setup.exe

Oracle

You can install Oracle in the following ways:

Oracle Enterprise Edition

The advantage of choosing Oracle Enterprise Edition is that you can implement the Oracle Partitioning feature to improve the performance of event-driven workload automation. This improves rule management performance, in particular the following queries: event_rule_instance, action_run, and operator_messages. For information about event-driven workload automation, see *Overview*.

Oracle Standard Edition

Oracle Standard Edition does not include the Oracle Partitioning feature. Installing this edition does not improve the performance of event-driven workload automation.

For supported versions, see the IBM Workload Scheduler System Requirements Document at [IBM Workload Scheduler Detailed System Requirements](#).



Note:

- When installing the product on a 64-bit library operating system, use an Oracle database on a 64-bit library.
- When upgrading:
 - If you already have an RDBMS installed and you want to upgrade it, you must upgrade it **after** you upgrade IBM Workload Scheduler.
 - Use an Oracle database on a 64-bit library when installing the product on a 64-bit library.

For information about upgrading the RDBMS, see the data maintenance chapter in the *Administration Guide*.

Informix

Before you create the IBM Workload Scheduler schema on the database, you must have created the following db and sb spaces:

- A db space sized 100 MB and with a page size of 8K or greater, referred to as **DBSPNAME** in the properties file customization steps.
- A db space space sized 20 MB, referred to as **TWS_DBSP_LOG** in the properties file customization steps.
- An sb space for blob and clob data, sized 100 MB, referred to as **TWS_SBSP** in the properties file customization steps.

OneDB

A decentralized backend, handling user authentication, data storage, and validation. Hosting an instance is very simple, so you can decide where you want to store your data, gaining complete control and ownership over your data.

MSSQL

Before you create the IBM Workload Scheduler schema on the database, you must have created the directory where the IBM Workload Scheduler table spaces will be placed when the IBM Workload Scheduler schema is created. The default is `C:\MSSQL`.

Azure SQL

A family of managed, secure, and intelligent products that use the SQL Server database engine in the Azure cloud

For a complete list of the correct versions to install, see the System Requirements Document at [IBM Workload Scheduler Detailed System Requirements](#).

IBM Workload Scheduler user management

The IBM Workload Scheduler user management on UNIX and Windows operating systems

About this task

Consider the following constraints and properties for the IBM Workload Scheduler user:

On Windows operating systems:

The installation process automatically creates the IBM Workload Scheduler user. If your security policies do not allow user creation during the installation process, create the user and give it the necessary rights as described in [Windows user domain rights and structure on page 50](#).

On UNIX and Linux operating systems:

Regardless of the method of installation you choose, the IBM Workload Scheduler user must be created manually before running the installation and must be enabled to login to the machine where the master domain manager is going to be installed. Use the appropriate UNIX™ and Linux™ operating system commands to create the user.



Note: Some operating systems require that for users with a password, the password must be changed at the first login. If this is your situation, for a successful installation, you will need to log in as the user and change the password for the first time.

Windows™ user domain rights and structure

About this task

If you install on Windows™ operating systems, consider the following information.

For the installation:

- You cannot have a local user and a domain user with the same name. For example, you cannot have **user1** as local user and at the same time **user1@domain1** and **domain\user1**.
- The Windows™ user performing an agent installation must:
 - For a local IBM Workload Scheduler user, be a member of the local administrative group
 - For a domain IBM Workload Scheduler user, be a member of the domain "users" group in the domain controller and be a member of the local administrative group.

For Windows™ IBM Workload Scheduler users:

All Windows™ IBM Workload Scheduler users must have the following user permissions. They can be granted locally. Domain level policies always override local policies, so you might be required to grant the permissions from the domain:

- Act as part of the operating system
- Allow log on locally
- Impersonate a client after authentication
- Log on as a batch job
- Log on as a service
- Replace a process level token
- Adjust memory quotas for a process (available on some configurations only)



Note: These rights are granted during the installation, but you can confirm them manually.

To run IBM Workload Scheduler command lines:**On Windows operating systems with UAC disabled:**

In addition to standard Windows permissions, to log on to the machine, the user must have the "Impersonate a client after authentication" permission granted. By default, this is granted just to the "Administrators" group members. This permission is required to impersonate the TWS user and access the IBM Workload Scheduler Symphony and Mailbox.

On Windows operating systems with UAC enabled:

This is the default value. The "Impersonate a client after authentication" is not available to the user, unless the cmd shell is started with "Run as administrator" permission. To run IBM Workload Scheduler command lines, the user must have "Impersonate a client after authentication" permission defined and then start the shell with the "Run as administrator" permission authenticating with its own user ID.

For the Streamlogon user:

The user must have the "logon as batch" permission to allow IBM Workload Scheduler to create the job process. In addition, you must assign to the user "Read" and "Read & execute" permission to cmd.exe. You can assign "Read" and "Read & execute" permission to cmd.exe also to the BATCH built-in group instead of to a single user.

To manage IBM Workload Scheduler agents:

The user must be in the Administrators group or must be able to perform "Run as" as **twuser** to reset the IBM Workload Scheduler files if a recovery is needed.

Considerations for Windows™ domain controllers running Microsoft™ Active Directory

If you want to install a IBM Workload Scheduler fault-tolerant agent on workstations where users who run jobs are domain users and the domain controller is running the Microsoft™ Active Directory, decide how to install the agents and configure the domain to have the jobmon process obtain the correct information to allow the users to run jobs.

About this task

Before running a job, jobmon retrieves information about the user running the job. If the user is a domain user and the domain controller is running Microsoft™ Active Directory, whether the user information can be retrieved depends on the information in the access control list (ACL) of that user. The main jobmon process that runs the job is started as the local system account (AUTHORITY\SYSTEM), but it immediately impersonates the *TWS_user* that owns the fault-tolerant agent. This means that for jobmon to successfully launch the job, the *TWS_user* must have an access control entry (ACE) in the ACL of the user for which it is trying to retrieve information.

Perform one of the following actions:

Enable the *TWS_user* to access a set of users that run jobs

On the domain server, edit the ACL of all users that run jobs on the workstation and add an ACE for each *TWS_user*. In this case, only specified users can run the jobs submitted by jobmon.

Allow all users to run jobs submitted by jobmon by using the `TWS_BYPASS_DC=TRUE` system variable

Create the `TWS_BYPASS_DC=TRUE` system variable, with a value not null, and reboot the workstation. In this case, jobmon obtains the user information without performing the security check for the ACE in the ACL of the user. All the local and domain users can run the jobs submitted by jobmon.

Allow all users to run jobs submitted by jobmon by setting the *TWS_user* as a domain user

Set up the *TWS_user* as a Windows™ domain user and install the instance of IBM Workload Scheduler using the *TWS_user*. In this case, all authenticated users on the domain controller can access the default ACL for a domain user. Jobs can then be launched by both local and the domain users. All the local and the domain users can run the jobs submitted by jobmon.

Exclude the workstation from the security check on users ACL

On the domain server, add the host name of the workstation where the fault-tolerant agent is installed to the Pre-Windows 2000-Compatible Access Group. In this way, from a security point of view, the domain controller interacts with this workstation as if it is in a Windows™ domain that does not support Active Directory. In this case, all the local and domain users can run the jobs submitted by jobmon. In addition, the domain controller does not prevent any local or domain users from running other processes that are not controlled by IBM Workload Scheduler.

Scanning system prerequisites for IBM Workload Scheduler

Before installing or upgrading the product, IBM Workload Scheduler automatically runs a scan on your system.

Before you begin

When installing IBM Workload Scheduler using the `serverinst` script, the script first runs the scanner to verify system prerequisites.



Note: To ensure that the prerequisite scan process does not fail, verify that the `bc` executable is present on the local system and that it is set in the `PATH` environment variable. If you do not want to install the `bc` executable, you can skip the prerequisites check by using the `skipcheckprereq` parameter when running the `serverinst` and `twinsinst` parameters. For more information about the `bc` executable, see [bc, an arbitrary precision calculator language](#). For more information about installation commands, see [Master components installation - serverinst script on page 357](#) and [Agent installation parameters - twinsinst script on page 108](#).

About this task

Having an environment that meets the product system requirements ensures that an installation or upgrade succeeds without any delays or complications.

The scan verifies that:

- The operating system is supported for the product.
- On UNIX™ operating systems, the necessary product libraries are installed.
- There is enough permanent and temporary disk space to install both the product and its prerequisites.
- There is enough memory and virtual memory.



Note: The scan verifies only that the environment meets the requirements of IBM Workload Scheduler. It does not check the requirements for other components, such as DB2®.

If any of these checks fails, IBM Workload Scheduler returns an error message.

The log files for the master components are located in:

On Windows™ operating systems:

```
<TWA_home>\logs\serverinst<version_number>.log
```

On UNIX™ and Linux™ operating systems:

```
<TWA_DATA_DIR>/installation/logs/serverinst<version_number>.log
```

The log files for the Dynamic Workload Console are located in:

On Windows™ operating systems:

```
<DWC_home>\logs\dwcinst<version_number>.log
```

On UNIX™ and Linux™ operating systems:

```
<DWC_DATA_dir>/installation/logs/dwcinst<version_number>.log
```

The log files for the agents are located in:

On Windows™ operating systems:

```
<TWA_home>\logs\twsinst<interp><user_name><version_number>.log
```

On UNIX™ and Linux™ operating systems:

```
<TWA_DATA_DIR>/installation/logs/twsinst<interp><user_name><version_number>.log
```

You can decide to rerun the installation or upgrade without executing the prerequisite scan. If you set the **-skipcheckprereq** parameter to `true` when performing the installation, the installation script does not execute the prerequisite scan. If a problem occurs, an error is displayed, the component is installed or upgraded, but might not work. For more information about the `-skipcheckprereq` parameter in all installation scripts, see the reference section in the *IBM Workload Scheduler: Planning and Installation*.

Starting from version 9.5, Fix Pack 2, the prerequisite scan no longer verifies the presence on the local system of 32-bit libraries. However, the extended agent for MVS requires a set of libraries on Linux PPC. You can find the updated list of libraries, in addition to a detailed list of supported operating systems and the most up-to-date product prerequisites, in [IBM Workload Scheduler Detailed System Requirements](#).

Typical installation scenario

Scenario for a fresh typical installation at the latest product version of IBM® Workload Scheduler



This scenario describes how to perform a fresh install at the latest product version of the full software stack for IBM® Workload Scheduler, which consists of the following components and workstations:

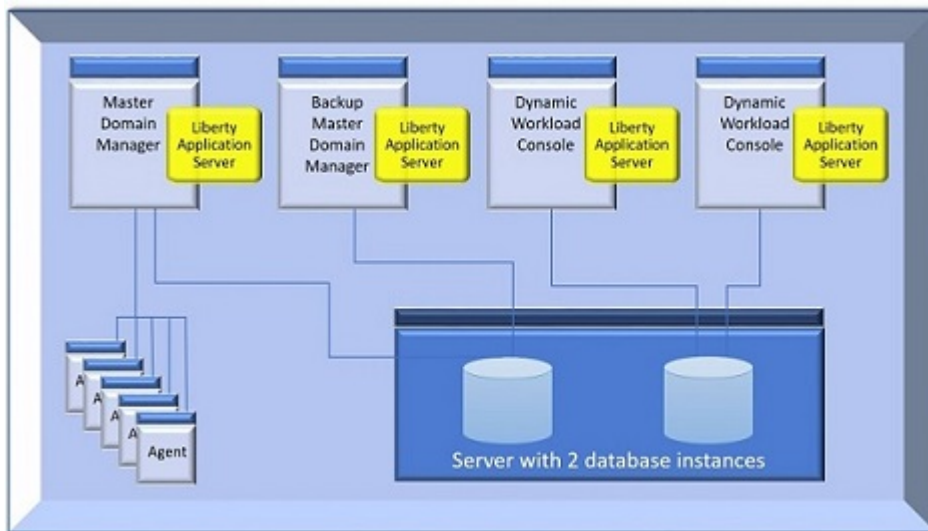
- One workstation for the database server which hosts both the master domain manager and Dynamic Workload Console databases.
- One workstation for the master domain manager and the related WebSphere Application Server Liberty Base.
- One workstation for the backup master domain manager and the related WebSphere Application Server Liberty Base. The master domain manager and backup master domain manager share the same database. This ensures the backup master domain manager has the latest data and can take over seamlessly, in case the master domain manager fails.
- Two workstations for two Dynamic Workload Console installations, each of them with their related WebSphere Application Server Liberty Base. The two Dynamic Workload Console instances share the same database.
- A number of agents.

The installation process installs both the General Availability version 9.5 and the latest fix pack version. All fix pack images include the refreshed code containing the General Availability version 9.5 and the latest fix pack. Hence, an installation performed from the fix pack image installs both the General Availability version 9.5 and the latest fix pack version.

Figure 12: Typical IBM Workload Scheduler architecture on page 55 describes how the IBM® Workload Scheduler components listed above are usually installed.

You can now proceed to [Creating and populating the database on page 58](#).

Figure 12. Typical IBM® Workload Scheduler architecture



Installing WebSphere Application Server Liberty Base

WebSphere Application Server Liberty Base is required on all workstations where you plan to install the master components and the Dynamic Workload Console.

Before you begin

On AIX and Linux workstations, ensure you permanently set the **ulimit** parameter as follows:

- data segment process (option **-d**) = unlimited
- file size (option **-f**) = unlimited
- max user processes (option **-u**) = >260000 up to unlimited
- open files (option **-n**) = >100000 up to unlimited
- max memory size (option **-m**) = unlimited
- stack size (option **-s**) = >33000 up to unlimited

On the master domain manager, these settings must be applied to:

- root
- the IBM® Workload Scheduler administrative user

On the Dynamic Workload Console, these settings must be applied to:

- root
- the Dynamic Workload Console installation user (if this user is different from root)



Ensure that your system meets the operating system and Java requirements. For more information, see WebSphere Application Server Liberty Base detailed system requirements.

About this task

You can quickly install WebSphere Application Server Liberty Base by extracting an archive file on all supported platforms.

Install WebSphere Application Server Liberty Base on all of the following workstations, which comprise a typical installation:

- master domain manager
- backup domain manager
- two Dynamic Workload Console installations on two separate workstations

To extract the archive, you can use your own Java Ext or use the Java Ext provided with the IBM® Workload Scheduler image. The provided Java Ext is located in the following path in the image for your operating system:

IMAGE_DIR/TWS/INTERP/Tivoli_Eclipse_INTERP/TWS/JavaExt.

To install WebSphere Application Server Liberty Base, perform the following steps:

1. Download WebSphere Application Server Liberty Base from [Recommended updates for WebSphere Application Server Liberty](#).

Each WebSphere Application Server Liberty Base image is packaged as a jar file named

```
wlp-base-all-fix_pack.jar
```



Note: To update IBM® Workload Scheduler to version 9.5 Fix Pack 6, the minimum required version of WebSphere® Liberty is 22.0.0.3 or later.

2. Install WebSphere Application Server Liberty Base by extracting the archive file to a directory of your choice.

On Windows operating systems

```
java -jar liberty_download_dir\wlp-base-all-fix_pack.jar
--acceptLicense install_dir
```

On UNIX operating systems

```
java -jar liberty_download_dir/wlp-base-all-fix_pack.jar
--acceptLicense install_dir
```

where:

liberty_download_dir

The directory where you downloaded WebSphere Application Server Liberty Base.

install_dir

The directory where you want to install WebSphere Application Server Liberty Base.



Note: Note that the value of the `install_dir` parameter must match the value to be defined for the `wlmdir` parameter when installing the master domain manager and its backup, dynamic domain manager and its backup, and the Dynamic Workload Console.

3. Ensure the IBM® Workload Scheduler administrative user that you created has the rights to run WebSphere Application Server Liberty Base and full access to the installation directory. If WebSphere Application Server Liberty Base is shared between the master domain manager and the Dynamic Workload Console, ensure also the Dynamic Workload Console user has the same rights.

Results

You have now successfully installed WebSphere Application Server Liberty Base.

What to do next

You can now proceed to [Encrypting passwords \(optional\) on page 57](#).

Encrypting passwords (optional)

How to encrypt passwords required by the installation and upgrade process

About this task



1. Open a shell command line.
2. Set the `JAVA_HOME` environment variable. If you do not have Java installed, you can optionally use the Java version provided with the IBM® Workload Scheduler installation image and available in:

IBM® Workload Scheduler

```
<IMAGE_DIR>/TWS/platform/Tivoli_Eclipse_platform/TWS/JavaExt/jre/
```

Dynamic Workload Console

```
<DWC_IMAGE_DIR>/java/jre/bin
```

3. Browse to the following path:

```
Liberty_installation_dir/bin
```

4. You can encrypt passwords using either of the following methods:

{xor}

```
securityUtility encode my_password>
```

{aes}

```
securityUtility encode --encoding=aes my_password>
```

Result

An output similar to the following is returned:

xor format

```
{xor}MjY+Lz4sbnGRLTs=
```

aes format

```
{aes}AFC3jj9cR0YyqR+3CONBzVi8deLb2Bossb9GGroh8UmDPGikIzXZzid3nzY0IhnSg==
```

5. Provide the encrypted passwords when typing the commands or save them in the properties file for each command.

What to do next

You can now proceed to [Creating and populating the database on page 58](#).

Creating and populating the database

Create the required databases before you begin the installation.



Before you start the installation, you must create and populate the database for both the master domain manager and the Dynamic Workload Console. If you are using the default database Derby for the Dynamic Workload Console, you can skip this step for the Dynamic Workload Console and perform only the master domain manager database procedure.

 **Note:**

Supported configurations: IBM Workload Scheduler supports direct customer use of the Apache Derby database in test environments only. The product does not support direct customer use of Apache Derby database in production environments. The product supports the use of Apache Derby only by internal application server components in production environments.

You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in [FAQ - Database customizations on page 83](#). Links to customization options which are specific for a single database, if any, are provided in the related scenario.

The procedure differs for each supported database, as listed below:

DB2

- [Creating and populating the database for DB2 for the master domain manager on page 60.](#)
- [Creating and populating the database for DB2 for the Dynamic Workload Console on page 62](#)
- [Creating and populating the database for DB2 for z/OS for the Dynamic Workload Console on page 64](#)

Oracle

- [Creating the database for Oracle for the master domain manager on page 68](#)
- [Creating the database for Oracle for the Dynamic Workload Console on page 70](#)

Informix and OneDB

- [Creating the database for Informix or OneDB for the master domain manager on page 72](#)
- [Creating the database for Informix or OneDB for the Dynamic Workload Console on page 74](#)

MSSQL

- [Creating the database for MSSQL for the master domain manager on page 75](#)
- [Creating and populating the database for MSSQL for the Dynamic Workload Console on page 78](#)

Azure SQL

- [Creating the database for Azure SQL for the master domain manager on page 80](#)
- [Creating and populating the database for Azure SQL for the Dynamic Workload Console on page 81](#)

A set of scripts and SQL files is provided for each database type to perform actions such as granting rights or reorganizing the database. These files are located in `inst_dir/TWS/dbtools` into a separate folder for each database type. To use these files, copy the relevant folder to the database server.



Note: If you create the schema on your own, ensure the COLLATE value is set appropriately. Consider the following examples:

DB2

```
db2 get db cfg for TWS | grep -i collating
```

The expected values are:

```
Database collating sequence = IDENTITY
Alternate collating sequence (ALT_COLLATE) =
```

MSSQL

```
select DATABASEPROPERTYEX('Your DB Name','collation')
```

The expected values is:



Latin1_General_BIN2

Creating and populating the database for DB2 for the master domain manager

Instructions for creating and populating the IBM® Workload Scheduler database for DB2 for the master domain manager

About this task



You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in [FAQ - Database customizations on page 83](#).

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

DB2 requires a specific procedure in which you first create the database and then create and populate the database tables. To simplify the database creation, a customized SQL file named `create_database.sql` is provided, containing the specifics for creating the IBM® Workload Scheduler database. The database administrator can use this file to create the database. After the database has been created, you can proceed to create and populate the database tables.

You can optionally configure DB2 in SSL mode by specifying the `--sslkeyfolder` and `--sslpassword` parameters when you run the `configureDb` command.

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

Default values are stored in the `configureDb.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `configureDb.properties` file, but do not modify the `configureDb.template` file located in the same path.

To create and populate the IBM® Workload Scheduler database and tables, perform the following steps:

1. On the workstation where you plan to install the master domain manager, extract the IBM® Workload Scheduler package to a directory of your choice.
2. Browse to the `image_location/TWS/interp_name/Tivoli_MDM_interp_name/TWS/tws_tools` path.
3. Edit the `create_database.sql` file by replacing the default value for the database name (**TWS**) with the name you intend to use.
4. Provide the `create_database.sql` file to the DB2 administrator to run on the DB2 database.

The following command creates the IBM® Workload Scheduler database:

```
db2 -tvf file_location>/create_database.sql
```

5. Instruct the DB2 administrator to create the DB2 user on the server hosting the DB2 database. You will then specify this user with the `dbuser` parameter when creating and populating the database with the `configureDb` command on the master domain manager.
6. Browse to the path `image_location/TWS/interp_name`.
7. Type the following command to create and populate the IBM® Workload Scheduler database tables with typical settings:

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype DB2 --dbhostname DB_hostname
--dbport db_port --dbname db_name --dbuser db_user
--dbadminuser DB_administrator
--dbadminuserpw DB_administrator_password
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype DB2 --dbhostname DB_hostname
--dbport db_port --dbname db_name --dbuser db_user
--dbadminuser DB_administrator
--dbadminuserpw DB_administrator_password
```

where:

--rdbmstype

The database vendor.

--dbhostname *db_hostname*

The host name or IP address of database server.

--dbport *db_port*

The port of the database server.

--dbname *db_name*

The name of the IBM® Workload Scheduler database.

--dbuser *db_user*

The database user you must create before running the `configureDb` command.

--dbadminuser *db_admin_user*

The database administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--dbadminuserpw *db_admin_password*

The password of the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server.



Note: The following parameters are also required when installing the master components and their values must be the same:

- **--rdbmstype**
- **--dbhostname**



- **--dbport**
- **--dbname**
- **--dbuser**

Results

You have now successfully created and populated the IBM® Workload Scheduler database.

You can now proceed to [Creating and populating the database for DB2 for the Dynamic Workload Console on page 62](#).

Creating and populating the database for DB2 for the Dynamic Workload Console

Instructions for creating and populating the Dynamic Workload Console database for DB2

Before you begin

Ensure a DB2 database is installed.

About this task



You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in the section about FAQ - Database customizations in IBM® Workload Scheduler: Planning and Installation.

DB2 requires a specific procedure in which you first create the database and then create and populate the database tables. To simplify the database creation, a customized SQL file named `create_database.sql` is provided containing the specifics for creating the Dynamic Workload Console database. The database administrator can use this file to create the database. After the database has been created, you can proceed to create and populate the database tables.

You can optionally configure DB2 in SSL mode by specifying the **--sslkeyfolder** and **--sslpassword** parameters when you run the `configureDb` command.

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

Default values are stored in the `configureDb.properties` file, located in `image_location`. If you need to modify any of the default values, edit the `configureDbdatabase_vendor>.properties` file, but do not modify the `configureDbdatabase_vendor>.template` file located in the same path.

To create and populate the Dynamic Workload Console database and schema for DB2, perform the following steps:

1. On the workstation where you plan to install the Dynamic Workload Console, extract the Dynamic Workload Console package to a directory of your choice.
2. Browse to the `image_location/DWC_interp_name/tools` path.
3. Edit the `create_database.sql` file by replacing the default value for the database name (**DWC**) with the name you intend to use.
4. Provide the `create_database.sql` file to the DB2 administrator to run on the DB2 database.

The following command creates the IBM® Workload Scheduler database:

```
db2 -tvf file_location>/create_database.sql
```

5. Instruct the DB2 administrator to create the DB2 user on the server hosting the DB2 database. You will then specify this user with the `dbuser` parameter when creating and populating the database with the `configureDb` command on the Dynamic Workload Console. When you run the `configureDb` command, this user is automatically granted access to the Dynamic Workload Console tables on the database server.
6. On the server where you plan to install the Dynamic Workload Console, browse to the directory where you extracted the Dynamic Workload Console image.
7. Type the following command to create and populate the Dynamic Workload Console database tables with typical settings:

On Windows operating systems

```
cscript configureDb.vbs --rdmstype DB2 --dbhostname DB_hostname
--dbport db_port --dbname db_name --dbuser db_user
--dbadminuser DB_admin_user --dbadminuserpw DB_admin_pwd
```

On UNIX operating systems

```
./configureDb.sh --rdmstype DB2 --dbhostname DB_hostname
--dbport db_port --dbname db_name --dbuser db_user
--dbadminuser DB_admin_user --dbadminuserpw DB_admin_pwd
```

where:

--rdmstype

The database vendor.

--dbhostname *db_hostname*

The host name or IP address of database server.

--dbport *db_port*

The port of the database server.

--dbname *db_name*

The name of the Dynamic Workload Console database.

--dbuser *db_user*

The database user you must create before running the `configureDb` command. When you run the `configureDb` command, this user is automatically granted access to the IBM® Workload Scheduler tables on the database server.

--dbadminuser *db_admin_user*

The database administrator user that creates the Dynamic Workload Console schema objects on the database server.

--dbadminuserpw *db_admin_password*

The password of the DB administrator user that creates the Dynamic Workload Console schema objects on the database server.



Note: The following parameters specified with the configureDb command are also required when installing the Dynamic Workload Console and their values must be the same:

- **--rdbmstype**
- **--dbhostname**
- **--dbport**
- **--dbname**
- **--dbuser**

Results

You have now successfully created and populated the Dynamic Workload Console database.

For more information about all parameters and supported values of the configureDb command, see [Database configuration - configureDB script on page 345](#).

What to do next

You can now proceed to [Creating the IBM Workload Scheduler administrative user on page 91](#).

Creating and populating the database for DB2 for z/OS for the Dynamic Workload Console

Instructions for creating and populating the database for DB2 for z/OS for Dynamic Workload Console

Before you begin

Ensure a DB2 for z/OS database is installed.

About this task



You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in the section about FAQ - Database customizations in *IBM Workload Scheduler: Planning and Installation*.

DB2 for z/OS requires a specific procedure in which you first create the database and then create and populate the database tables. To simplify the database creation, a sample JCL named `EQQINDWC` is provided with APAR PH22448 containing the specifics for creating the Dynamic Workload Console database. The database administrator can use this file to create the database. After the database has been created, you can proceed to create and populate the database tables.

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#). Default values are stored in the `configureDb.properties` file, located in `image_location`.

If you need to modify any of the default values, edit the `configureDbdatabase_vendor>.properties` file, but do not modify the `configureDbdatabase_vendor>.template` file located in the same path.

To create and populate the Dynamic Workload Console database and schema for DB2 for z/OS, perform the following steps:

1. From the `SEQQSAMP` library, edit the `EQQINDWC` sample JCL as required.



Note: The `EQQINDWC` sample JCL is provided with the APAR PH22448. If you did not install this APAR, create a JCL named `EQQINDWC` that looks like the following example:

```
//JOB CARD
//*****
//*
//* SECURITY CLASSIFICATION:
//* Licensed Materials - Property of HCL 5698-T08
//* Copyright HCL Technologies Ltd. 2020 All rights reserved.
//* US Government Users Restricted Rights - Use, duplication
//* or disclosure restricted by GSA ADP Schedule Contract
//*
//*
//* CREATES DB2 STORAGE GROUP AND DATABASE for DWC
//* NOTE1:You must tailor this JCL sample to conform to
//* installation standards defined at your location.
//* - Add a JOB card
//* - Change following DB/2 values according to your
//* current environment:
//* - DSN.V11R1M0.SDSNLOAD DB/2 library
//* - DSN111.RUNLIB.LOAD DB/2 run library
//* - DBB1 DB/2 system name
//* - DSNTIA11 DB/2 DSNTIAD plan name
//* - volname volume name
//* - catname catalog name
//* - Change all the occurrences of
//* TWSSDWC if you need a storage group with a different name*/
//*
//* Flag Reason Rlse Date Origin Flag Description
//* -----
//* $EGE=IWSZ950 952 200121 ZLIB: DB2 on DWC
//*****
//EQQINDWC EXEC PGM=IKJEFT01,DYNAMNBR=20
//STEPLIB DD DISP=SHR,DSN=DSN.V11R1M0.SDSNLOAD
//SYSTSPRT DD SYSOUT=*
```



```
//SYSTSIN DD *
  DSN SYSTEM(DBB1)
  RUN PROGRAM(DSNTIAD) PLAN(DSNTIA11) LIB('DSN111.RUNLIB.LOAD')
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN DD *
CREATE STOGROUP TWSSDWC VOLUMES(volname) VCAT catname;
CREATE DATABASE DWC
BUFFERPOOL BP0
INDEXBP BP16K0
STOGROUP TWSSDWC
CCSID UNICODE;
COMMIT;
```

2. Instruct the DB2 for z/OS administrator to create the DB2 for z/OS user on the server hosting the DB2 for z/OS database. You will then specify this user with the `dbuser` parameter when creating and populating the database with the `configureDb` command on the Dynamic Workload Console. When you run the `configureDb` command, this user is automatically granted access to the Dynamic Workload Console tables on the database server.
3. On the server where you plan to install the Dynamic Workload Console, browse to the directory where you extracted the Dynamic Workload Console image.
4. Type the following command to create and populate the Dynamic Workload Console database tables with typical settings:

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype DB2Z --dbhostname DB_hostname
--dbport db_port --dbname db_name --dbuser db_user
--dbadminuser DB_admin_user --dbadminuserpw DB_admin_pwd
--zlocationname zOS_location_containing_db --zbufferpoolname buffer_pool_in_zOS_location
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype DB2Z --dbhostname DB_hostname
--dbport db_port --dbname db_name --dbuser db_user
--dbadminuser DB_admin_user --dbadminuserpw DB_admin_pwd
--zlocationname zOS_location_containing_db --zbufferpoolname buffer_pool_in_zOS_location
```

On z/OS operating systems

```
./configureDb.sh --rdbmstype DB2Z --dbhostname DB_hostname
--dbport db_port --dbname db_name --dbuser db_user
--dbadminuser DB_admin_user --dbadminuserpw DB_admin_pwd
--zlocationname zOS_location_containing_db --zbufferpoolname buffer_pool_in_zOS_location
```

where:

--rdbmstype

The database vendor.

--dbhostname *db_hostname*

The host name or IP address of database server.

--dbport *db_port*

The port of the database server.

--dbname *db_name*

The name of the Dynamic Workload Console database.

--dbuser *db_user*

The database user you must create before running the `configureDb` command. When you run the `configureDb` command, this user is automatically granted access to the IBM® Workload Scheduler tables on the database server.

--dbadminuser *db_admin_user*

The database administrator user that creates the Dynamic Workload Console schema objects on the database server.

--dbadminuserpw *db_admin_password*

The password of the DB administrator user that creates the Dynamic Workload Console schema objects on the database server.

--zlocationname *zos_location_containing_db*

The name of an already existing location in the z/OS environment that will contain the new database. The default value is LOC1.

--zbufferpoolname *buffer_pool_in_zos_location*

The name of an already existing buffer pool created in the location specified by `-zlocationname`. The default value is BP32K.



Note: The following parameters specified with the `configureDb` command are also required when installing the Dynamic Workload Console and their values must be the same:

- **--rdmstype**
- **--dbhostname**
- **--dbport**
- **--dbname**
- **--dbuser**
- **--zlocationname**

Results

You have now successfully created and populated the Dynamic Workload Console database.

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

What to do next

You can now proceed to [Creating the IBM Workload Scheduler administrative user on page 91](#).

Creating the database for Oracle for the master domain manager

Instructions for creating and populating the IBM® Workload Scheduler database for Oracle for the master domain manager

Before you begin

Ensure the following required tablespaces have been already created on the Oracle database server which hosts the master domain manager database:

- tablespace for IBM® Workload Scheduler data
- tablespace for IBM® Workload Scheduler log
- tablespace for IBM® Workload Scheduler plan

About this task



You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in [FAQ - Database customizations on page 83](#).

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

Default values are stored in the `configureDbOracle.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `configureDbOracle.properties` file, but do not modify the `configureDbOracle.template` file located in the same path.

If you plan to use different locales in your environment, ensure you read the [TWS: missing JobStream dependencies and jobs in the model and/or JobStream in the plan with Oracle Db](#) tech note.

To create and populate the IBM® Workload Scheduler database and schema, perform the following steps:

1. On the server where you plan to install the master domain manager, extract the IBM® Workload Scheduler package to a directory of your choice.
2. Browse to `image_location/TWS/interp_name`.
3. Type the following command to create and populate the IBM® Workload Scheduler database with typical settings:

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype ORACLE --dbname service_name
--dbuser db_user --dbpassword DB_password --dbhostname DB_hostname
--dbadminuser DB_administrator --dbadminuserpw DB_administrator_password
--iwsname USERS --iwslogtsname USERS --iwsplantsname USERS
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype ORACLE --dbname service_name
--dbuser db_user --dbpassword DB_password --dbhostname DB_hostname
--dbadminuser DB_administrator --dbadminuserpw DB_administrator_password
--iwstsname USERS --iwslogtsname USERS --iwsplantsname USERS
```

where:

--rdbmstype

The database vendor.

--dbhostname *db_hostname*

The host name or IP address of database server.

--dbport *db_port*

The port of the database server.

--dbname *db_name*

The service name of the IBM® Workload Scheduler database.

dbuser *db_user*

The user to be granted access to the IBM® Workload Scheduler tables on the database server.

--dbpassword *db_password*

The password for the user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--dbadminuser *db_admin_user*

The database administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--dbadminuserpw *db_admin_password*

The password of the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--iwstsname|-tn *table_space_name*

The name of the tablespace for IBM® Workload Scheduler data. This parameter is required.

--iwslogtsname|-ln *log_table_space*

The name of the tablespace for IBM® Workload Scheduler log. This parameter is required.

--iwsplantsname|-pn *plan_table_space*

The name of the tablespace for IBM® Workload Scheduler plan. This parameter is required.



Note: The following parameters specified with the configureDb command are also required when installing the master components and their values must be the same:



- **rdbmstype**
- **dbhostname**
- **dbport**
- **dbname**
- **dbuser**
- **dbpassword**

Results

You have now successfully created and populated the IBM® Workload Scheduler database.

You can now proceed to [Creating the database for Oracle for the Dynamic Workload Console on page 70](#).

Creating the database for Oracle for the Dynamic Workload Console

Instructions for creating and populating the Dynamic Workload Console database for Oracle

Before you begin

Ensure the required tablespace for IBM® Workload Scheduler data has been already created on the Oracle database server which hosts the Dynamic Workload Console database.

About this task



You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in [FAQ - Database customizations on page 83](#).

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

Default values are stored in the `configureDbOracleDatabase_vendor.properties` file, located in `image_location`. If you need to modify any of the default values, edit the `configureDbOracleDatabase_vendor.properties` file, but do not modify the `configureDbOracle.template` file located in the same path.

To create and populate the Dynamic Workload Console database, perform the following steps:

1. On the server where you plan to install the Dynamic Workload Console, extract the Dynamic Workload Console package to a directory of your choice.
2. Browse to the directory where you extracted the package.
3. Type the following command to populate the Dynamic Workload Console database with typical settings:

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype ORACLE --dbname service_name
--dbuser db_user --dbpassword DB_password --dbhostname DB_hostname
--dbadminuser DB_administrator --dbadminuserpw DB_administrator_password
--iwstsname USERS
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype ORACLE --dbname service_name
--dbuser db_user --dbpassword DB_password --dbhostname DB_hostname
--dbadminuser DB_administrator --dbadminuserpw DB_administrator_password
--iwstsname USERS
```

where:

--rdbmstype

The database vendor.

--dbname *db_name*

The service name of the IBM® Workload Scheduler database.

dbuser *db_user*

The user to be granted access to the IBM® Workload Scheduler tables on the database server.

--dbpassword *db_password*

The password for the user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--dbhostname *db_hostname*

The host name or IP address of database server.

--dbadminuser *db_admin_user*

The database administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--dbadminuserpw *db_admin_password*

The password of the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--iwstsname|tn *table_space_name*

The name of the tablespace for IBM® Workload Scheduler data. This parameter is required.



Note: The following parameters specified with the configureDb command are also required when installing the Dynamic Workload Console and their values must be the same:

- **rdbmstype**
- **dbhostname**
- **dbport**
- **dbname**



- **dbuser**
- **dbpassword**

Results

You have now successfully created and populated the Dynamic Workload Console database.

What to do next

You can now proceed to [Creating the IBM Workload Scheduler administrative user on page 91](#).

Creating the database for Informix or OneDB for the master domain manager

Instructions for creating and populating the IBM® Workload Scheduler database for Informix or OneDB for the master domain manager on UNIX operating systems. Both the database and the master domain manager must reside on UNIX operating systems.

Before you begin

Before you create the database for , ensure you have created the following db and sb spaces:

- A db space sized 100 MB and with a page size of 8K or greater. When you run the `configureDb` command, as described below, specify this db space for the following parameters:
 - `iwstname`
 - `iwslogtname`
 - `iwsplantname`
- An sb space for blob and clob data, sized 100 MB. When you run the `configureDb` command, as described below, specify this sb space for the `iwsbospace` parameter.

About this task



You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in [FAQ - Database customizations on page 83](#).

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

Default values are stored in the `configureDbIds.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `configureDbIds.properties` file, but do not modify the `configureDbIds.template` file located in the same path.

To create the IBM® Workload Scheduler database and schema, perform the following steps:

1. On the server where you plan to install the master domain manager, extract the IBM® Workload Scheduler package to a directory of your choice.
2. Browse to *image_location/TWS/interp_name*.
3. Type the following command to populate the IBM® Workload Scheduler database with typical settings:

On UNIX operating systems

```
./configureDb.sh --rdmstype IDS --dbname db_name --dbuser db_user
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
```

where:

--rdmstype

The database vendor.

--dbhostname db_hostname

The host name or IP address of database server.

--dbport db_port

The port of the database server.

--dbname db_name

The name of the IBM® Workload Scheduler database.

dbuser db_user

The user to be granted access to the IBM® Workload Scheduler tables on the database server.

--dbadminuser db_admin_user

The database administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--dbadminuserpw db_admin_password

The password of the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server.



Note: The following parameters specified with the `configureDb` command are also required when installing the master components and their values must be the same:

- **rdmstype**
- **dbhostname**
- **dbport**
- **dbname**
- **dbuser**

Results

You have now successfully created and populated the IBM® Workload Scheduler database.

You can now proceed to [Creating the database for Informix or OneDB for the Dynamic Workload Console on page 74](#).

Creating the database for Informix or OneDB for the Dynamic Workload Console

Instructions for creating and populating the Dynamic Workload Console database on UNIX operating systems. Both the database and the Dynamic Workload Console must reside on UNIX operating systems.

Before you begin

Before you create the database for Informix or OneDB, ensure you have created a db space sized 100 MB and with a page size of 8K or greater. When you run the `configureDb` command, as described below, specify this db space for the `iwstname` parameter.

About this task



You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in [FAQ - Database customizations on page 83](#).

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

Default values are stored in the `configureDbIds.properties` file, located in `image_location`. If you need to modify any of the default values, edit the `configureDbIdsdatabase_vendor.properties` file, but do not modify the `configureDbIdsdatabase_vendor.template` file located in the same path.

To create the Dynamic Workload Console database and schema, perform the following steps:

1. On the server where you plan to install the Dynamic Workload Console, extract the Dynamic Workload Console package to a directory of your choice.
2. Browse to the directory where you extracted the package.
3. To populate the Dynamic Workload Console database with typical settings, type the following command:

On UNIX operating systems

```
./configureDb.sh --rdbmstype IDS --dbname db_name --dbuser db_user
                --dbhostname db_hostname --dbadminuser db_admin
                --dbadminuserpw db_admin_password
```



Note: The following parameters specified with the `configureDb` command are also required when installing the Dynamic Workload Console and their values must be the same:



- **rdbmstype**
- **dbhostname**
- **dbport**
- **dbname**
- **dbuser**

Results

You have now successfully created and populated the Dynamic Workload Console database.

What to do next

You can now proceed to [Creating the IBM Workload Scheduler administrative user on page 91](#).

Creating the database for MSSQL for the master domain manager

Instructions for creating and populating the IBM® Workload Scheduler database for MSSQL for the master domain manager

About this task



You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in [FAQ - Database customizations on page 83](#).

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters. By default, MSSQL authentication is used. To modify the authentication type, see [How can I specify the authentication type when using an MSSQL database? on page 89](#).

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

Default values are stored in the `configureDbMSSQL.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `configureDbMSSQL.properties` file, but do not modify the `configureDbMSSQL.template` file located in the same path.



Note: Only on Windows systems hosting an MSSQL database, the path hosting the tablespaces must be existing before you run the `configureDb.vbs` command.

To create the IBM® Workload Scheduler database and schema, perform the following steps:

1. Only on Windows systems hosting an MSSQL database, create the path for hosting the following tablespaces, if the path is not already existing:
 - TWS_DATA
 - TWS_LOG
 - TWS_PLAN
2. Only on Windows systems hosting an MSSQL database, specify the path for the tablespaces when running the `configureDb.vbs` command or when filling in the `configureDbMSSQL.properties` properties file with the following parameters:
 - `--iwstspath`
 - `--iwslogtspath`
 - `--iwsplantspath`
- 3.
4. On the server where you plan to install the master domain manager, extract the IBM® Workload Scheduler package to a directory of your choice.
5. Browse to `image_location/TWS/interp_name`.
6. To populate the IBM® Workload Scheduler database with typical settings, type the following command:

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype MSSQL --dbname db_name
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
--iwstspath DATA_tablespace_path
--iwslogtspath LOG_tablespace_path
--iwsplantspath PLAN_tablespace_path
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype MSSQL --dbname db_name
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw DB_administrator_password
--iwstspath DATA_tablespace_path
--iwslogtspath LOG_tablespace_path
--iwsplantspath PLAN_tablespace_path
```

where:

--rdbmstype

The database vendor.

--dbhostname db_hostname

The host name or IP address of database server.

--dbport db_port

The port of the database server.

--dbname db_name

The name of the IBM® Workload Scheduler database.

dbuser db_user

The user to be granted access to the IBM® Workload Scheduler tables on the database server.

--dbadminuser db_admin_user

The database administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--dbadminuserpw db_admin_password

The password of the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--iwstspath|-tp table_space_path

The path of the tablespace for IBM® Workload Scheduler data. This parameter is optional. The default value for all databases other than Oracle is **TWS_DATA**. Only on Windows systems hosting an MSSQL database, ensure the folder for the tablespace is already existing before running the configureDb command and specify the path using this parameter. Specify the path using forward slashes (/), for example: `c : / <my_path> / TWS_DATA`.

--iwslogtspath|-lp log_path_table_space

The path of the tablespace for IBM® Workload Scheduler log. This parameter is optional. The default value for all databases other than Oracle is **TWS_LOG**. This parameter applies only to the master components. Only on Windows systems hosting an MSSQL database, ensure the folder for the tablespace is already existing before running the configureDb command and specify the path using this parameter. Specify the path using forward slashes (/), for example: `c : / <my_path> / TWS_LOG`.

--iwsplantspath|-pp plan_path_table_space

The path of the tablespace for IBM® Workload Scheduler plan. This parameter is optional. The default value for all databases other than Oracle is **TWS_PLAN**. This parameter applies only to the master components. Only on Windows systems hosting an MSSQL database, ensure the folder for the tablespace is already existing before running the configureDb command and specify the path using this parameter. Specify the path using forward slashes (/), for example: `c : / <my_path> / TWS_PLAN`.



Note: The following parameters specified with the configureDb command are also required when installing the master components and their values must be the same:

- **rdbmstype**
- **dbhostname**
- **dbport**
- **dbname**
- **dbuser**

Results

You have now successfully created and populated the IBM® Workload Scheduler database.

You can now proceed to [Creating and populating the database for MSSQL for the Dynamic Workload Console on page 78](#).

Creating and populating the database for MSSQL for the Dynamic Workload Console

Instructions for creating and populating the Dynamic Workload Console database for MSSQL

About this task



You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in [FAQ - Database customizations on page 83](#).

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters. By default, MSSQL authentication is used. To modify the authentication type, see [How can I specify the authentication type when using an MSSQL database? on page 89](#).

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#). If you need to modify any of the default values, edit the `configureDbMSSQLdatabase_vendor.properties` file, but do not modify the `configureDbMSSQLdatabase_vendor.template` file located in the same path.

Default values are stored in the `configureDbMSSQL.properties` file, located in `image_location`.



Note: Only on Windows systems hosting an MSSQL database, the path hosting the tablespace must be existing before you run the `configureDb.vbs` command.

To create the Dynamic Workload Console database and schema, perform the following steps:

1. Only on Windows systems hosting an MSSQL database, create the path for hosting the following tablespace, if the path is not already existing:
 - TWS_DATA
2. Only on Windows systems hosting an MSSQL database, specify the path to the folder when running the `configureDb.vbs` command or when filling in the `configureDbMSSQL.properties` properties file with the following parameter:
 - `--iwstspath`
3. On the server where you plan to install the Dynamic Workload Console, extract the Dynamic Workload Console package to a directory of your choice.
4. To populate the Dynamic Workload Console database with typical settings, type the following command:

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype MSSQL --dbname db_name
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
--iwstspath DATA_tablespace_path
```

On UNIX operating systems

```
./configureDb.sh --rdmstype MSSQL --dbname db_name
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
--iwstspath DATA_tablespace_path
```

where:

--rdmstype

The database vendor.

--dbname db_name

The name of the IBM® Workload Scheduler database.

--dbhostname db_hostname

The host name or IP address of database server.

--dbadminuser db_admin_user

The database administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--dbadminuserpw db_admin_password

The password of the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--iwstspath|-tp table_space_path

The path of the tablespace for IBM® Workload Scheduler data. This parameter is optional. The default value for all databases other than Oracle is **TWS_DATA**. Only on Windows systems hosting an MSSQL database, ensure the folder for the tablespace is already existing before running the configureDb command and specify the path using this parameter. Specify the path using forward slashes (/), for example: `c:/<my_path>/TWS_DATA`.



Note: The following parameters specified with the configureDb command are also required when installing the Dynamic Workload Console and their values must be the same:

- **rdmstype**
- **dbhostname**
- **dbport**
- **dbname**
- **dbuser**

Results

You have now successfully created and populated the Dynamic Workload Console database.

What to do next

You can now proceed to [Creating the IBM Workload Scheduler administrative user on page 91](#).

Creating the database for Azure SQL for the master domain manager

Instructions for creating and populating the IBM® Workload Scheduler database for Azure SQL for the master domain manager

About this task



You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in [FAQ - Database customizations on page 83](#).

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

Default values are stored in the `configureDbMSSQL.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `configureDbMSSQL.properties` file, but do not modify the `configureDbMSSQL.template` file located in the same path.

To create the IBM® Workload Scheduler database and schema, perform the following steps:

1. Specify the path for the tablespaces when running the `configureDb` command or when filling in the `configureDbMSSQL.properties` properties file with the following parameters:
 - `--iwstname PRIMARY`
 - `--iwslogtsname PRIMARY`
 - `--iwsplantsname PRIMARY`

You can optionally modify the `PRIMARY` default values when running the `configureDb` command.

2. On the server where you plan to install the master domain manager, extract the IBM® Workload Scheduler package to a directory of your choice.
3. Browse to `image_location/TWS/interp_name`.
4. To populate the IBM® Workload Scheduler database with typical settings, type the following command:

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype MSSQL --dbname db_name
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
--iwstname DATA_tablespace_name
--iwslogtsname LOG_tablespace_name
--iwsplantsname PLAN_tablespace_name
```


On UNIX operating systems

```
./configureDb.sh --rdbmstype MSSQL --dbname db_name
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw DB_administrator_password
--iwstsname DATA_tablespace_name
--iwslogtsname LOG_tablespace_name
--iwsplantsname PLAN_tablespace_name
```

where:

--rdbmstype

The database vendor.

--dbhostname db_hostname

The host name or IP address of database server.

--dbname db_name

The name of the IBM® Workload Scheduler database.

dbuser db_user

The user to be granted access to the IBM® Workload Scheduler tables on the database server.

--dbadminuser db_admin_user

The database administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--dbadminuserpw db_admin_password

The password of the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--iwstsname|-tn table_space_name

The name of the tablespace for IBM® Workload Scheduler data. This parameter is required.

--iwslogtsname|-ln log_table_space

The name of the tablespace for IBM® Workload Scheduler log. This parameter is required.

--iwsplantsname|-pn plan_table_space

The name of the tablespace for IBM® Workload Scheduler plan. This parameter is required.

Results

You have now successfully created and populated the IBM® Workload Scheduler database.

You can now proceed to [Creating and populating the database for Azure SQL for the Dynamic Workload Console on page 81](#).

Creating and populating the database for Azure SQL for the Dynamic Workload Console

Instructions for creating and populating the Dynamic Workload Console database for Azure SQL

About this task



You can perform a typical database procedure, as described in the following scenarios, or you can customize the database parameters, as described in [FAQ - Database customizations on page 83](#).

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#). If you need to modify any of the default values, edit the `configureDbMSSQLdatabase_vendor.properties` file, but do not modify the `configureDbMSSQLdatabase_vendor.template` file located in the same path.

Default values are stored in the `configureDbMSSQL.properties` file, located in `image_location`.

To create the Dynamic Workload Console database and schema, perform the following steps:

1. Specify the path to the folder when running the `configureDb` command or when filling in the `configureDbMSSQL.properties` properties file with the following parameter:
 - `--iwstname PRIMARY`

You can optionally modify the `PRIMARY` default value when running the `configureDb` command.
2. On the server where you plan to install the Dynamic Workload Console, extract the Dynamic Workload Console package to a directory of your choice.
3. To populate the Dynamic Workload Console database with typical settings, type the following command:

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype MSSQL --dbname db_name
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
--iwstname DATA_tablespace_name
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype MSSQL --dbname db_name
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
--iwstname DATA_tablespace_name
```

where:

--rdbmstype

The database vendor.

--dbname db_name

The name of the IBM® Workload Scheduler database.

--dbhostname *db_hostname*

The host name or IP address of database server.

--dbadminuser *db_admin_user*

The database administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--dbadminuserpw *db_admin_password*

The password of the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--iwststname|-tn *table_space_name*

The name of the tablespace for IBM® Workload Scheduler data. This parameter is required.

Results

You have now successfully created and populated the Dynamic Workload Console database.

What to do next

You can now proceed to [Creating the IBM Workload Scheduler administrative user on page 91](#).

FAQ - Database customizations

A list of questions and answers related to the customization of the database:

When creating and populating a database, you might have the need to customize some parameters to suit your environment.

- [How can I modify the tablespace? on page 83](#)
- [How can I avoid providing the database administrator credentials when creating the database with DB2? on page 85](#)
- [How can I configure a different temporary directory where files get downloaded? on page 85](#)
- [How can I generate the SQL files required to create the database schema? on page 86](#)
- [How can I use Oracle partitioning? on page 87](#)
- [How can I customize the Temp tablespace on Oracle? on page 88](#)
- [How can I check database consistency to avoid schema corruption? on page 88](#)
- [How can I specify the authentication type when using an MSSQL database? on page 89](#)
- [How can I customize the JDBC drivers for the database? on page 90](#)
- [How can I grant access to the database when the user installing the product is not the database administrator? on page 91](#)

How can I modify the tablespace?

How can I modify the tablespace?

If you do not want to use the default tablespace name and path, you can modify them when creating and populating the database with the configureDb command.

Proceed as follows:

1. Browse to the folder containing the configureDb command. The command is located in the following path, depending on the component for which you are installing:

master domain manager

image_location>/TWS/interp_name

Dynamic Workload Console

image_location>

2. When launching the configureDb command, as explained in [Installing the master domain manager and backup master domain manager on page 92](#) and [Installing the Dynamic Workload Console servers on page 100](#), modify the following parameters as necessary:

-iwstsnam|-tn *table_space_name*

The name of the tablespace for IBM® Workload Scheduler data. This parameter is optional. The default value is **TWS_DATA**.

-iwstspath|-tp *table_space_path*

The path of the tablespace for IBM® Workload Scheduler data. This parameter is optional. The default value is **TWS_DATA**.

-iwslogtsname|-ln *log_table_space*

The name of the tablespace for IBM® Workload Scheduler log. This parameter is optional. The default value is **TWS_LOG**.

-iwslogtspath|-lp *log_path_table_space*

The path of the tablespace for IBM® Workload Scheduler log. This parameter is optional. The default value is **TWS_LOG**.

-iwsplantsname|-pn *plan_table_space*

The name of the tablespace for IBM® Workload Scheduler plan. This parameter is optional. The default value is **TWS_PLAN**.

-iwsplantspath|-pp *plan_path_table_space*

The path of the tablespace for IBM® Workload Scheduler plan. This parameter is optional. The default value is **TWS_PLAN**.

For more information about the configureDb command, see [Database configuration - configureDB script on page 345](#).

How can I avoid providing the database administrator credentials when creating the database with DB2?

Minimum required grants to manage the IBM® Workload Scheduler database with DB2

If you prefer to keep the database administrator credentials confidential and you are using DB2, you can assign a user a minimum set of grants to create, access, and modify the IBM® Workload Scheduler database.

Using the `configureDb` command, you can perform the following operations:

- Create the custom SQL statement to create or upgrade the IBM® Workload Scheduler database schema.
- Apply the generated SQL statement to upgrade the IBM® Workload Scheduler schema to the latest version.

Each of the previous steps requires a set of minimum grants.

Minimum required grants to create the IBM® Workload Scheduler database and table spaces

Run the `configureDb` command with the `--execsql` parameter set to **FALSE** to generate the `customSQLAdmin.sql` file containing the **CREATE DATABASE** statement.

After creating the database, run the `configureDb` command with the `--execsql` parameter set to **FALSE** to generate the `customSQL.sql` file containing the SQL statements to create table spaces and schemas. Extract from the `customSQL.sql` file the statements to **CREATE** the **BUFFERPOOLS** and **TABLESPACES**.

To create the IBM® Workload Scheduler database and the **BUFFERPOOLS** and **TABLESPACES**, one of the following minimum grants is required:

- SYSADM
- SYSCTRL
- SELECT privilege on the **PRIVILEGES** administrative view

Grant to create and upgrade the IBM® Workload Scheduler database schema

To create the IBM® Workload Scheduler schema in the database, run the `configureDb` command with the following authorities and authorizations:

- **CREATETAB** on database
- **CONNECT** on database
- **USE** on all IBM® Workload Scheduler table spaces
- **SELECT** privilege on the **PRIVILEGES** administrative view

Run the `configureDb` command with the `--execsql` parameter set to **TRUE** to create or upgrade the IBM® Workload Scheduler database schema.

How can I configure a different temporary directory where files get downloaded?

Customizing the working directory of the database.

If you do not want to use the default working directory, where temporary files are stored, you can customize it when creating and populating the database with the `configureDb` command.

Proceed as follows:

1. Browse to the folder containing the `configureDb` command. The command is located in the following path, depending on the component for which you are installing:

master domain manager

image_location/TWS/interp_name

Dynamic Workload Console

image_location

2. When launching the `configureDb` command, as explained in [Installing the master domain manager and backup master domain manager on page 92](#) and [Installing the Dynamic Workload Console servers on page 100](#), modify the following parameter as necessary:

work_dir

The working directory where you extract the installation image. It also contains the output produced by the command, such as the SQL statements if you set the `execsql` parameter to `false`. The default value is `/tmp` on UNIX operating systems and `C:\tmp` on Windows operating systems.

For more information about the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

How can I generate the SQL files required to create the database schema?

Generating the SQL files for the database schema

If you do not have the access rights to generate the schema in the database, you can create the required SQL files and then provide them to the database administrator. If you do have the access rights to generate the schema in the database, you might also want to generate the SQL files and review them before applying them to the database.

Proceed as follows:

1. Browse to the folder containing the `configureDb` command. The command is located in the following path, depending on the component for which you are installing:

master domain manager

image_location/TWS/interp_name

Dynamic Workload Console

image_location

2. When launching the `configureDb` command on the workstation where you plan to install the master domain manager or Dynamic Workload Console, as explained in [Creating and populating the database on page 58](#), set `- execsql` parameter set to `false`:

-execsql|-es *execute_sql*

Set to **true** to generate and run the SQL file, set to **false** to generate the SQL statement without running it. The resulting files are stored in the path defined in the **work_dir** parameter. This option is useful if you want to review the file before running it. This parameter is optional. The default value is **true**.

3. The command creates the relevant SQL scripts containing the settings you have defined in the command line. The files are created in the working directory, which by default is `/tmp` on UNIX operating systems and `C:\tmp` on Windows operating systems.

For more information about the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

How can I use Oracle partitioning?

Using Oracle partitioning.

Partitioning is a powerful functionality that enables tables, indexes, and index-organized tables to be subdivided into smaller pieces, allowing these database objects to be managed and accessed at a finer level of granularity. Moreover, the Oracle partitioning feature can improve the performance of the auditing feature and event-driven workload automation. This functionality improves rule management performance, in particular the following queries:

- `event_rule_instance`
- `action_run`
- `operator_messages`

If partitioning is already enabled in your Oracle database, proceed as follows:

1. Browse to the folder containing the `configureDb` command. The command is located in the following path, depending on the component for which you are installing:

master domain manager

image_location/TWS/interp_name

Dynamic Workload Console

image_location

2. When launching the `configureDb` command, as explained in [Installing the master domain manager and backup master domain manager on page 92](#) and [Installing the Dynamic Workload Console servers on page 100](#), modify the following parameter as necessary:

--usePartitioning

Only applies when installing the master domain manager. Set to **true** if you want to use the Oracle partitioning feature, otherwise set it to **false**. This parameter is optional. The default value is **true**.

For more information about the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

How can I customize the Temp tablespace on Oracle?

Customizing the IBM Workload Scheduler Temp tablespace on Oracle

If you do not want to use the default Oracle Temp tablespace, you can customize it when creating and populating the database with the configureDb command.

Proceed as follows:

1. Browse to the folder containing the configureDb command. The command is located in the following path, depending on the component for which you are installing:

master domain manager

image_location/TWS/interp_name

Dynamic Workload Console

image_location

2. When launching the configureDb command, as explained in [Installing the master domain manager and backup master domain manager on page 92](#) and [Installing the Dynamic Workload Console servers on page 100](#), modify the following parameter:

--iwsTempTsName IWS_temp_path

Only applies when installing the master domain manager. The path of the tablespace for IBM Workload Scheduler temporary directory. This parameter is optional. The default value is **TEMP**.

For more information about the configureDb command, see [Database configuration - configureDB script on page 345](#).

How can I check database consistency to avoid schema corruption?

Checking and maintaining database consistency

The database administrator can verify if the database schema has changed and repair any inconsistencies.

Proceed as follows:

1. Browse to the folder containing the configureDb command. The command is located in the following path, depending on the component for which you are installing:

master domain manager

image_location/TWS/interp_name

Dynamic Workload Console

image_location

2. When launching the configureDb command, as explained in [Installing the master domain manager and backup master domain manager on page 92](#) and [Installing the Dynamic Workload Console servers on page 100](#), set the - `execsql` parameter to **false**:

-execsql|-es *execute_sql*

Set to **true** to generate and run the SQL file, set to **false** to generate the SQL statement without running it. The resulting files are stored in the path defined in the **work_dir** parameter. This option is useful if you want to review the file before running it. This parameter is optional. The default value is **true**.

This parameter generates a number of SQL files, which you can check to look for any inconsistencies. For example, if you find CREATE instructions, this means that some records or indexes are missing in the database.

3. If you identify any inconsistencies, provide the files to the database administrator to run on the database and fix the inconsistencies.

For more information about the configureDb command, see [Database configuration - configureDB script on page 345](#).

How can I specify the authentication type when using an MSSQL database?

Configuring the authentication type for the MSSQL database.

When using an MSSQL database, you can choose between two different authentication types:

- MSSQL authentication. This is the default value.
- Windows authentication

To define the authentication type, proceed as follows:

1. Browse to the folder containing the configureDb command. The command is located in the following path, depending on the component for which you are installing:

master domain manager

image_location/TWS/interp_name

Dynamic Workload Console

image_location

2. When launching the configureDb command, as explained in [Creating and populating the database on page 58](#), specify the **auth_type** argument with one of the following values:

SQLSERVER

Enables MSSQL authentication type. Only the user specified with the **--dbadminuser** argument has the grants to administer the IBM® Workload Scheduler database. This is the default value.

WINDOWS

Enables Windows authentication type. The Windows user you used to log on to the workstation is assigned the grants to administer the IBM® Workload Scheduler database.

For more information about all parameters and supported values of the configureDb command, see [Database configuration - configureDB script on page 345](#).

How can I customize the JDBC drivers for the database?

How can I customize the JDBC drivers for the database?

If you do not want to use the default JDBC drivers, for example because more updated drivers have been released in the meantime, you can replace them with a few easy steps for both the master domain manager and Dynamic Workload Console.

Proceed as follows:

1. Download the updated JDBC drivers for your database.
2. Create a backup of the existing JDBC drivers installed together with the product in the following paths:

master domain manager

On Windows operating systems

`TWA_home\TWS\jdbcdrivers\default_RDBMS`

On UNIX operating systems

`TWA_home/TWS/jdbcdrivers/default_RDBMS`

Dynamic Workload Console

On Windows operating systems

`DWC_home\jdbcdrivers\default_RDBMS`

On UNIX operating systems

`DWC_home/jdbcdrivers/default_RDBMS`

where

default_RDBMS

Indicates one of the following directories related to the database you are using for the master domain manager and the Dynamic Workload Console:

- db2
- db2z
- derby
- informix (applies to Informix and OneDB)
- mssql (applies to MSSQL and Azure SQL)
- oracle

3. Stop WebSphere® Liberty for master domain manager and Dynamic Workload Console, as described in the section about Application server - starting and stopping in *Administration Guide*.
4. Replace the default JDBC drivers with the updated ones. Ensure you maintain the same path and rename the updated drivers to the exact name of the previous drivers.
5. Start WebSphere® Liberty for master domain manager and Dynamic Workload Console, as described in the section about Application server - starting and stopping in *Administration Guide*.



Note: When you upgrade the master domain manager and Dynamic Workload Console to a new product version, the customized JDBC drivers are replaced by the drivers included in the product installation packages. To continue using custom JDBC drivers, repeat this procedure.

How can I grant access to the database when the user installing the product is not the database administrator?

Steps to grant access to the database tables when the user installing the product is not the database administrator.

If the user installing the product is not the database administrator, ensure you run the `grant_twsuser.sql` script before you run the `configureDb` script.

This ensures the database user is granted all proper rights.

The `grant_twsuser.sql` is available in `TWA_home/TWS/dbtools/<database_vendor>/sql`.

Creating the IBM® Workload Scheduler administrative user

Instructions to create the IBM® Workload Scheduler administrative user



IBM® Workload Scheduler administrative user

The IBM® Workload Scheduler administrator creates the administrative user (**wauser**). The administrative user is the user for which the product will be installed in the subsequent steps. This implies that this user has full access to all scheduling objects.

The user name can contain alphanumeric, dash (-), and underscore (_) characters; it cannot contain national characters. The first character of the user name must be a letter.

The following considerations apply:

On Windows operating systems:

- If this user account does not already exist, it is automatically created at installation time.
- If installing on a Windows™ server in a domain, do not define a domain and local ID with the same user name.
- If you specify a domain user, define the name as `domain_name\user_name`.
- If you specify a local user, define the name as `system_name\user_name`. Type and confirm the password.

On UNIX and Linux operating systems:

This user account must be created manually before running the installation and must be enabled to login to the machine where the master domain manager is going to be installed. Create a user with a home directory and group. Use the appropriate UNIX and Linux operating system commands to create the user.

For more information, see [IBM Workload Scheduler user management on page 50](#).

Example

You can now proceed to [Installing the master domain manager and backup master domain manager on page 92](#).

Installing the master domain manager and backup master domain manager

A fresh installation for the master domain manager and the backup master domain manager

About this task



Note: Automatic failover triggers a switch to a backup master domain manager without manual intervention under certain conditions. To take advantage of this feature, you must install the master domain manager and backup master domain managers with the same user. With a fresh installation of a master domain manager on Linux and UNIX, a new extended agent is installed on the master domain manager workstation which is used to communicate where to run the FINAL job stream. For information about configuring automatic failover, see the topic about enabling automatic failover in the *Administration Guide*.

Procedure to install a master domain manager and backup master domain manager

Before you begin

Before starting the installation, ensure the following steps have been completed:

1. [Installing WebSphere Application Server Liberty Base on page 55](#) on the workstation where you plan to install the master domain manager and on the workstation where you plan to install the backup master domain manager.
2. [Creating and populating the database on page 58](#)
3. [Creating the IBM Workload Scheduler administrative user on page 91](#)



Note: When installing a backup master domain manager, the backup points to the existing IBM® Workload Scheduler database. In this case, creating and populating the database is not required.

About this task

You can perform a typical installation, as described in the following scenario, or you can customize the installation parameters, as described in [FAQ - master domain manager and backup master domain manager customizations on page 97](#).

For more information about all **serverinst** parameters and default values, see [Master components installation - serverinst script on page 357](#).

You can optionally configure your environment in SSL mode, by using the **--sslkeyfolder** and **--sslpassword** parameters and generating automatically the certificates for each workstation in your environment.

The procedure to install the master domain manager and backup master domain manager is exactly the same, with the difference that it is performed on two different workstations and that each installation points to its local WebSphere Application Server Liberty Base installation. IBM® Workload Scheduler determines whether or not a master domain manager is already present in the environment and proceeds to install a master domain manager or backup master domain manager accordingly.

The IBM® Workload Scheduler administrator installs the master domain manager and backup master domain manager. The following information is required:

Table 4. Required information

Command parameter	Information type	Provided in..
Database information		
--rdbmstype	database type	Creating and populating the database on page 58
--dbhostname	database hostname	
--dbport	database port	
--dbname	database name	
--dbuser	database user name	
--dbpassword	database password	
IBM® Workload Scheduler information		
--wuser	IBM® Workload Scheduler administrative user name	Creating the IBM Workload Scheduler administrative user on page 91
--wapassword	IBM® Workload Scheduler administrative user password	
WebSphere Application Server Liberty Base information		

Table 4. Required information

(continued)

--wlpdir	WebSphere Application Server Liberty Base installation directory	Installing WebSphere Application Server Liberty Base on page 55
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You can run the **serverinst** command specifying a typical set of parameters. In this case, default values are used for all remaining parameters. For more information about all **serverinst** parameters and default values, see [Master components installation - serverinst](#) on page 357.

Default values are stored in the `serverinst.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `serverinst.properties` file, but do not modify the `serverinst.template` file located in the same path.

To install the master domain manager and backup master domain manager, perform the following steps:

1. Log in as root or Administrator to the workstation where you plan to install.
2. Browse to the folder where the `serverinst` command is located in `image_location/TWS/interp_name`.
3. Start the installation specifying a typical set of parameters. In this case, default values are used for all remaining parameters:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --rdbmstype <db_type>
--dbhostname <db_hostname> --dbport <db_port> --dbname <db_name>
--dbuser <db_user> --dbpassword <db_password> --wuser <wa_user>
--wapassword <wa_password> --wlpdir <Liberty_installation_dir>\wlp
--sslkeysfolder <certificate_files_path> --sslpassword <keystore_truststore_password>
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --rdbmstype <db_type>
--dbhostname <db_hostname> --dbport <db_port> --dbname <db_name>
--dbuser <db_user> --dbpassword <db_password> --wuser <wa_user>
--wapassword <wa_password> --wlpdir <Liberty_installation_dir>/wlp
--sslkeysfolder <certificate_files_path> --sslpassword <keystore_truststore_password>
```

where

--acceptlicense

Specify **yes** to accept the product license.

--rdbmstype|-r rdbms_type

The database type. Supported databases are:

- db2
- oracle

- ids (informix, only on UNIX operating systems)
- mssql

This parameter is optional. The default value is **db2**.

--dbhostname *db_hostname*

The host name or IP address of database server.

--dbport *db_port*

The port of the database server.

--dbname *db_name*

The name of the IBM® Workload Scheduler database.

--dbuser *db_user*

The database user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--dbpassword *db_password*

The password for the user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--wouser *user_name*

The user for which you are installing IBM Workload Scheduler.

--wapassword *wouser_password*

The password of the user for which you are installing IBM Workload Scheduler.

On Windows operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_), characters, and ()|?*~+.

On UNIX operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_), characters, and ()|?*~+.

--wlpdir

The path where WebSphere Application Server Liberty Base is installed.

--sslkeyfolder

The name and path of the folder, containing either the keystore (`TWSServerKeyFile.jks`), the key database (`TWSClientKeyStore.kdb`), and the truststore (`TWSServerTrustFile.jks`, `TWSClientKeyStoreJKS.jks`) files, you need to provide when supplying custom certificates (only on UNIX operating systems), or certificates in .PEM format:

- Only on UNIX operating systems, if you provide the keystore and truststore files, these files are used to configure SSL communication using the passwords you provide with the **--keystorepassword** and **--truststorepassword** respectively.



Note: When installing using the keystore, key database, and truststore files, you are required to manually configure these files prior the installation setup. If providing custom `.jks` files, it is your responsibility to provide such `.jks` files equipped with all the CA certificates they need in the truststore. For these reasons, this procedure is not recommended.

- If you provide `.PEM` certificates, the installation program automatically generates the keystore and truststore files using the password you specify with the **--sslpassword** parameter. The folder must contain the following files:

- **ca.crt**
The Certificate Authority (CA) public certificate.
- **tls.key**
The private key for the instance to be installed.
- **tls.crt**
The public part of the previous key.

You can optionally create a subfolder to contain one or more `*.crt` files to be added to the server truststore as trusted CA. This can be used for example to add to the list of trusted CAs the certificate of the LDAP server or DB2 server. Additionally, you can store here any intermediate CA certificate to be added to the truststore. The subfolder must be named **additionalCAs**.

This parameter is required if you set the **--dbsslconnection** parameter to true.

--sslpassword

If you provide `.PEM` certificates with the **--sslkeyfolder** parameter, this is the password for the certificates automatically generated by the installation program. This parameter is mutually exclusive with the **keystorepassword** and **truststorepassword** parameters, which apply when you provide the keystore and truststore files using the **sslkeyfolder** parameter.



Note: The values for the following parameters must match the values you provided when creating and populating the database:

- **--rdbmstype**
- **--dbhostname**
- **--dbport**
- **--dbname**
- **--dbuser**
- **--dbpassword**



See [Creating and populating the database on page 58](#), then follow the link to the database vendor you are using for more information about command parameters.



Note: Before starting the deployment of a new master domain manager or backup master domain manager on an already used database, be sure that no failed plan creation/extension has been performed. If a failed plan creation/extension has been performed, resolve the failure before attempting the new deployment or unlock the database by running the `planman unlock db` command.

4. To verify that the installation completed successfully, browse to the directory where you installed the master domain manager and type the following commands:

```
./tws_env.sh
```

```
optman ls
```

This command lists the IBM® Workload Scheduler configurations settings and confirms that IBM® Workload Scheduler installed correctly.

Results

You have now successfully installed the master domain manager and backup master domain manager.

If you want to customize more installation parameters, see [FAQ - master domain manager and backup master domain manager customizations on page 97](#).

What to do next

You can proceed to [Installing the Dynamic Workload Console servers on page 100](#).

FAQ - master domain manager and backup master domain manager customizations

A list of questions and answers related to the customization of the master domain manager and backup master domain manager installation

When installing the master domain manager and backup master domain manager, you can perform a typical installation, as described in [Installing the master domain manager and backup master domain manager on page 92](#) or you can customize a number of parameters, as described in the following scenarios:

How do I customize general information for the master domain manager installation?

How to customize general information for the master domain manager installation.

How do I define the language of the messages?

To define the language in which messages are displayed, use the **-lang** parameter, as follows:

-lang lang_id

The language in which the `serverinst` messages are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used. If neither **-lang** nor LANG are used, the default codepage is set to SBCS. For a list of valid values for these variables, see the following table:

Table 5. Valid values for -lang and LANG

parameter	
Language	Value
Brazilian portuguese	pt_BR
Chinese (traditional and simplified)	zh_CN, zh_TW
English	en
French	fr
German	de
Italian	it
Japanese	ja
Korean	ko
Russian	ru
Spanish	es



Note: This is the language in which the installation log is recorded and not the language of the installed engine instance. `serverinst` installs all languages as default.

How do I modify the installation directory?

To modify the directory where the product is installed, use the **-inst_dir** parameter, as follows:

-inst_dir installation_dir

The directory of the IBM Workload Scheduler installation. This parameter is optional. The default value is calculated at installation time, based on the user performing the installation.

-work_dir working_dir

The temporary directory used by the program to deploy the installation process files. This parameter is optional. The default value is calculated at installation time, based on the user performing the installation.

I am confident that all my prerequisites are in order. How do I skip the prerequisites check?

To skip the prerequisites, use the **-skipcheckprereq** parameter, as follows:

-skipcheckprereq

If you set this parameter to `false`, IBM Workload Scheduler does not scan system prerequisites before starting the installation. This parameter is optional. The default value is `true`. For more information about the prerequisite check, see [Scanning system prerequisites for IBM Workload Scheduler on page 52](#).

How do I customize configuration information for the data source?

How to customize configuration information for the data source used by the master domain manager

How do I change the RDBMS type?

To use a different database than the default DB2, use the **-rdbmstype** parameter when typing the **serverinst** command, as follows:

-rdbmstype db2 | oracle | ids | mssql

Specify the database type you want to use. Supported databases are:

- DB2
- Oracle
- Informix
- MSSQL

For more information about supported database versions, see the [Data Integration](#) report, click on the **Prerequisites** tab, then click on **Databases**.

I prefer not to use the default IBM® Workload Scheduler database name (TWS). How do I change the database name?

To use a different database than the default DB2, use the **-dbname** parameter, as follows:

dbname db_name

Specify the name you want to use for the database. Note that this name must match the name specified in the `configureDb` command. For more information about the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

How can I specify a different database user?

To specify a different database name than the default value, use the **-dbuser** parameter, as follows:

dbuser db_user

Specify the name of the database user that accesses the IBM® Workload Scheduler tables on the database server.

How can I specify a different database port?

To specify a different database port than the default value, use the **-dbport** parameter, as follows:

dbport *db_port*

Specify the port of the database server.

How do I customize configuration information for the master domain manager?

How to customize the configuration of the master domain manager

How can I customize the *data_dir* folder to maintain the previous behavior and store the data generated by IBM Workload Scheduler, such as logs, and configuration information together with the product binaries?

By default, at installation time product data and data generated by IBM® Workload Scheduler, such as logs and configuration information are stored in the *data_dir* folder, separated from the product binaries.

If you want to revert to the previous behavior, where product data and product binaries were stored together, use the **--data_dir** argument to specify the IBM® Workload Scheduler. For more information about the **--data_dir** argument, see [Master components installation - serverinst script on page 357](#).

You can also specify the **--data_dir** argument when installing the Dynamic Workload Console with the `dwcinst` command and the agents with the `twsinst` command. For more information, see [Dynamic Workload Console installation - dwcinst script on page 369](#) and [Agent installation parameters - twsinst script on page 108](#).

If you deploy the product components using Docker containers, the `<data_dir>` is set to the default directory name and location, and it cannot be modified.

Installing the Dynamic Workload Console servers

Procedure for installing two Dynamic Workload Console servers on two separate nodes.

About this task



Note: Supported configurations: IBM Workload Scheduler supports direct customer use of the Apache Derby database in test environments only. The product does not support direct customer use of Apache Derby database in production environments. The product supports the use of Apache Derby only by internal application server components in production environments.

Procedure for installing the Dynamic Workload Console

About this task

In this scenario, the IBM® Workload Scheduler administrator installs two Dynamic Workload Console instances on two separate workstations, sharing the same remote database. The IBM® Workload Scheduler administrator performs the operations listed below on both workstations.

You can optionally configure your environment in SSL mode, by using the `--sslkeyfolder` and `--sslpassword` parameters and generating automatically the certificates for each workstation in your environment.

The IBM® Workload Scheduler administrator installs the Dynamic Workload Console. The following information is required:

Table 6. Required information

Command parameter	Required information	Provided in..
Database information		
<code>--rdbmstype</code>	database type	Creating and populating the database on page 58
<code>--dbhostname</code>	database hostname	
<code>--dbport</code>	database port	
<code>--dbname</code>	database name	
<code>--dbuser</code>	database user name	
<code>--dbpassword</code>	database password	
WebSphere Application Server Liberty Base information		
<code>--wlpdir</code>	WebSphere Application Server Liberty Base installation directory	Installing WebSphere Application Server Liberty Base on page 55

You can run the `dwcinst` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

Default values are stored in the `dwcinst.properties` file, located in the root directory of the installation image.

If you need to modify any of the default values, edit the `dwcinst.properties` file, but do not modify the `dwcinst.template` file located in the same path.

In a typical installation scenario, it is recommended you install the Dynamic Workload Console as a **non-root user** on UNIX systems and as a **local administrator** on Windows systems.

This user is automatically created by the installation process in the WebSphere Application Server Liberty Base repository. Ensure that the user has full access to the WebSphere Application Server Liberty Base installation directory.

Before starting the Dynamic Workload Console installation, ensure the following steps have been completed:

1. [Installing WebSphere Application Server Liberty Base on page 55](#) on the workstations where you plan to install the Dynamic Workload Console
2. [Creating and populating the database on page 58](#)
3. [Creating the IBM Workload Scheduler administrative user on page 91](#)



Note: To avoid installation failure, ensure that the `inst_dir` parameter is different from the directory of the installation image.

To install the Dynamic Workload Console, perform the following steps:

Start the installation specifying a typical set of parameters:

On Windows operating systems

```
cscript dwcinst.vbs --acceptlicense yes --rdbmstype db_type
--user dwc_admin_user --password dwc_pwd --dbname db_name
--dbuser db_user --dbpassword db_pwd --dbhostname db_hostname
--dbport db_port --wlpdir Liberty_installation_dir\wlp
--sslkeysfolder certificate_files_path --sslpassword keystore_truststore_password
```

On UNIX operating systems

```
./dwcinst.sh --acceptlicense yes --rdbmstype db_type
--user dwc_admin_user --password dwc_pwd --dbname db_name
--dbuser db_user --dbpassword db_pwd --dbhostname db_hostname
--dbport db_port --wlpdir Liberty_installation_dir/wlp
--sslkeysfolder certificate_files_path --sslpassword keystore_truststore_password
```

where,

user *dwc_admin_user*

is the administrator of the Dynamic Workload Console. You can use this account to log in to the Dynamic Workload Console and manage your environment.

password *dwc_pwd*

is the password of the Dynamic Workload Console user.

On Windows operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_) characters, and `()!*~+.`

On UNIX operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_) characters, and `()!*~+.`

Results

You have now successfully installed the Dynamic Workload Console.

For more information about all `dwcinst` parameters and default values, see [Dynamic Workload Console installation - dwcinst script on page 369](#).

What to do next

You can now proceed to [Installing agents on page 103](#).

Installing agents

How to install an IBM Workload Scheduler fault-tolerant agent or dynamic agent in your distributed or end-to-end network by using the twsinst script.

About this task



When you install a fault-tolerant agent, also the remote command line client is installed.

Use only the twsinst script to install agents. If you are installing a dynamic agent, you can optionally add the Java™ run time which is needed to run job types with advanced options, and to configure a gateway to open communication with the dynamic workload broker.

When you install a dynamic or a fault-tolerant agent, also the following access methods, that extend the job scheduling capabilities of IBM Workload Scheduler to other software products, are installed:

PeopleSoft

To run and monitor PeopleSoft jobs from the IBM Workload Scheduler environment.

SAP

To create, schedule, and control SAP jobs by using the job scheduling features of IBM Workload Scheduler.

z/OS

To define and schedule jobs that run in a z/OS environment with JES2, JES3, or IBM Z Workload Scheduler

See *IBM Workload Automation: Scheduling Applications with IBM Workload Automation* for details about configuring and using the access methods.



Important: In order to be entitled to use the access methods and plug-ins, you must have purchased at least one of the following offerings: IBM Workload Scheduler, IBM Workload Scheduler for Applications, or IBM Z Workload Scheduler Agent. See the IBM Workload Scheduler Download document for details: [IBM Workload Scheduler download document](#). For information about the supported versions of the plug-ins and access methods, open the [Data Integration](#) report and select the **Supported Software** tab.

During each step of the installation process, the twsinst script creates files in the installation directory that you specified in the command. If you do not specify an installation directory in the `-inst_dir` option in the command, the script creates files in the following directories:

On Windows™ operating systems

```
%ProgramFiles%\IBM\TWA_TWS_USER
```

On UNIX™ operating systems

```
/opt/IBM/TWA_TWS_USER
```

Where *TWS_USER* is the user for which you are installing the IBM Workload Scheduler instance that you specify in the command.

The dynamic agent installation process automatically adds the workstation definition to the database and registers the workstation definition to the dynamic workload broker installed on the master domain manager or the dynamic domain manager that you specify during the installation process.

You can organize dynamic agents in pools to help organize your environment based on the availability of workstations and the requirements of the jobs to be run. Normally, when you create a pool, you add the dynamic agents to a workstation definition of type pool.

You can also register an agent with a pool by directly editing the `pools.properties` file located in `<TWS_home>/ITA/cpa/config`. See the topic about automatically registering agents to a pool in the *Planning and Installation Guide*.

You can optionally enable secure SSL communication for dynamic agents by downloading and deploying to dynamic agents the certificates already available on the master domain manager using the **wouser** and **wapassword** parameters when you run the `twinst` installation script. Ensure the certificates are available on the master domain manager in the `TWA_DATA_DIR/ssl/depot` path.

An alternative method for enabling SSL communication, which applies to dynamic agents and fault-tolerant agents, involves using the **sslkeyfolder** and **sslpassword** parameters when you run the `twinst` installation script.

You only need to provide the path to the certificates and the password you want to define for the keystore and truststore. IBM® Workload Scheduler automatically generates the keystore and truststore with the specified password and configures WebSphere Application Server Liberty Base and your agents in SSL mode.

Enabling SSL during installation requires Java run time, which you can add at installation time using the **adjruntime** parameter, also available in the `twinst` installation script. For more information, see [Agent installation parameters - twinst script on page 108](#).

At installation time, you can optionally create a subfolder on the master domain manager to contain one or more `*.crt` files to be added to the server truststore as trusted CA using the **sslkeyfolder** parameter. This can be used for example to add to the list of trusted CAs the certificate of the LDAP server or Db2 server. Additionally, you can store here any intermediate CA certificate to be added to the truststore. The subfolder must be named **additionalCAs**.

Procedure

Before you begin

1. Before you start to install, upgrade, or uninstall, verify that the user that runs the installation process has the following authorization requirements:

Windows™ operating system

If you set the Windows User Account Control (UAC), your login account must be a member of the Windows™ **Administrators** group or domain administrators with the rights **Act as Part of the Operating System**.

If you set the Windows User Account Control (UAC) on the workstation, you must run the installation as **administrator**.

UNIX™ and Linux™ operating systems

To install a fault-tolerant agent, the user must have **root** access.

2. Ensure that you downloaded the IBM Workload Scheduler agent elmage (for details, see the Download Document at [IBM Workload Scheduler download document](#)).
3. Ensure that you have enough temporary space before you start the installation process.

About this task

You can install a fault-tolerant or dynamic agent in a distributed or an end-to-end environment.

To install an IBM Workload Scheduler agent, perform the following steps:

On Windows™ operating systems:

1. Download the agent elmage. For more information, see [IBM Workload Scheduler download document](#).
2. Log in as administrator on the workstation where you want to install the product.
3. From the `image_directory\TWS\operating_system` directory, run `twsinst` by using the following syntax:

```
cscript twsinst.vbs -new -uname username -password user_password -acceptlicense yes
```

For a description of the syntax parameters and a complete list of them, see [Agent installation parameters - twsinst script on page 108](#).



Note: `twsinst` for Windows™ is a Visual Basic Script (VBS) that you can run in CScript and WScript mode.

The IBM Workload Scheduler user is automatically created. The software is installed by default in the IBM Workload Scheduler installation directory. The default value is `%ProgramFiles%\IBM\TWA`.

If you enabled the Security Warning, a dialog box is displayed during the installation. In this case answer Run to continue.

On UNIX™ and Linux™ operating systems:

1. Download the agent elmage. For more information about elimages, see [Downloading installation images on your workstation on page 201](#) or the [IBM Workload Scheduler download document](#).
2. If you plan to login as **root** on the workstation where you will install the agent, create the IBM Workload Scheduler user. The software is installed by default in the user's home directory, referred to as `/installation_dir/TWS`.

User:

`TWS_user`

Home:

`/installation_dir/TWS` (for example: `/home/user1/TWS` where `user1` is the name of IBM Workload Scheduler user). Ensure this directory has **755** permission.

If you plan to log in as a non-root user (available only for dynamic agents), your login will become by default the only possible user of the agent. You do not need to create another IBM Workload Scheduler user, but make sure that you have a home directory (where the agent will be installed), and that it has **755** permission.

! **Important:** If you use the `-su non-root username` command in the shell where you are about to run `twinsinst`, make sure that `$HOME` is set on your home directory as a non-root user (use `echo $HOME` to verify that the value returned corresponds to your home directory).

3. Log in on the workstation where you want to install the product.
4. From the `image_directory/TWS/operating_system` directory, run `twinsinst` by using the following syntax:

```
./twinsinst -new -uname username -acceptlicense yes
```

For a description of the syntax parameters, see [Agent installation parameters - twinsinst script on page 108](#)

If the installation fails, to understand the cause of the error see [Analyzing return codes for agent installation, upgrade, restore, and uninstallation on page 145](#).

After a successful installation, perform one of the following configuration tasks, depending on the type of agent you installed:

- [Configuring a fault-tolerant agent on page 125](#).
- [Configuring a dynamic agent on page 188](#).

On Windows™ operating systems:

Show command usage and version

```
cscript twinsinst.vbs -u | -v
```

Install a new instance

```
cscript twinsinst.vbs -new -uname username
  -password user_password
  -acceptlicense yes|no
  [-addruntime true|false]
  [-agent dynamic|fta|both]
  [-company company_name]
  [-displayname agentname]
  [-domain user_domain]
  [-gateway local|remote|none]
  [-gweifport gateway_eif_port]
  [-gwid gateway_id]
  [-hostname host_name]
  [-inst_dir install_dir]
  [-jimport port_number]
  [-jimportssl true|false]
  [-lang lang_id]
  [-master master_cpu_name]
  [-password user_password]
  [-port port_number]
  [-skip_usercheck]
  [-skipcheckprereq]
  [-tdwbhostname host_name]
```

```
[-tdwbport tdwbport_number]  
[-thiscpu workstation]  
[-work_dir working_dir]
```

On UNIX™ and Linux™ operating systems

Show command usage and version

```
./twsinst -u | -v
```

Install a new instance

```
./twsinst -new -uname username  
-acceptlicense yes|no  
[-addruntime true|false]  
[-agent dynamic|fta|both]  
[-company company_name]  
[-create_link]  
[-displayname agentname]  
[-gateway local|remote|none]  
[-gweifport gateway_eif_port]  
[-gwid gateway_id]  
[-hostname hostname]  
[-inst_dir install_dir]  
[-jport port_number]  
[-jportssl true|false]  
[-lang lang_id]  
[-master master_cpu_name]  
[-port port_number]  
[-reset_perm]  
[-skip_usercheck]  
[-skipcheckprereq]  
[-tdwhostname host_name]  
[-tdwbport tdwbport_number]  
[-thiscpu workstation]  
[-work_dir working_dir]
```

Agent installation parameters - twsinst script

Agent installation parameters that can be passed to the twsinst script.

About this task

This section lists and describes the parameters that are used when running a **twsinst** script to install the fault-tolerant or dynamic agent.

To see some sample agent installation scenarios see [Example installations on page 116](#) and [Dynamic agent gateway installation examples on page 119](#).

-acceptlicense *yes/no*

Specify whether to accept the License Agreement.

-addruntime *true/false*

Adds the Java™ run time to run job types with advanced options, both those types that are supplied with the product and the additional types that are implemented through the custom plug-ins. Valid values are **true** and

false. The default for a fresh installation is **true**. Set this parameter to true if you use the **sslkeyfolder** and **sslpassword** parameters to define custom certificates in **.PEM** format.

This option is applicable to both fault-tolerant agents and dynamic agents.

If you decided not to install Java™ run time at installation time, you can still add this feature later as it is described in [Adding a feature on page 196](#).

-agent *dynamic/fta/both*

The type of agent that you want to install. Valid values are:

dynamic

To install a IBM Workload Scheduler dynamic agent. Use this value with the **-tdwbhostname** *host_name* and the **-tdwbport** *tdwbport_number* parameters.

fta

To install a IBM Workload Scheduler fault-tolerant agent.

both

To install the dynamic agent that is used with the **-tdwbhostname** *host_name* and the **-tdwbport** *tdwbport_number* parameters, and a fault-tolerant agent.

The default is **dynamic**.

-agentid *agentid*

The unique identifier of the agent that you want to install. The parameter is optional. If not specified, the installation process assigns to the agent a string of alphanumeric characters, as in the following example:

```
893164748CCA4FC6820F12685AECBB07
```

It might be useful to specify an *agentid* when you want to reinstall an agent after it was uninstalled, and you want to use the same *agentid*. This prevents that two different *agentid* values are registered on the server for the same agent installation.

-company *company_name*

The name of the company. The company name cannot contain blank characters. The name is shown in program headers and reports. If not specified, the default name is COMPANY.

-create_link

UNIX™ systems only. Create the **symlink** between `/usr/bin/at` and `install_dir/TWS/bin/at`. For more information, see [Table 2: Symbolic link options on page 36](#).

data_dir

This argument applies to UNIX operating systems only. Specify a path for product data, such as log and configuration files, if you want to install the product binaries separated from the product data. This argument is optional. The default value is `INSTALL_DIR/TWSDATA`.

-displayname *name*

The name to assign to the agent. The name cannot start with a number. The default is the host name of this computer.

If the host name starts with a number, **-displayname** parameter must be specified.

-domain user_ domain

Windows™ systems only. The domain name of the IBM Workload Scheduler user. The default is the name of the workstation on which you are installing the product. Ensure you use `USERDOMAIN` instead of `USERDNSDOMAIN`.

-gateway local|remote|none

Specifies whether to configure a gateway to communicate with the dynamic workload broker or not, and how it is configured. Specify *local* if the gateway is local to the dynamic agent workstation. Specify *remote* if the dynamic agent communicates through a gateway that is installed on a different dynamic agent workstation from the dynamic agent being installed. Only for version 9.5 Fix Pack 4, if you set **-gateway** to *remote* and want to install the agent in SSL mode, ensure that the agent can connect directly to the MDM at installation time. This is required only for the time interval necessary for downloading the certificates. (After the download has completed, you can return the agent to communicating through the gateway). The default value is *none*, no gateway is configured.

-gweifport gateway_ eif_ port

Specifies the Job Manager Event Integration Facility (EIF) port number. The default value is **31132**. The valid range is 1 to 65535.

-gwid gateway_ id

The unique identifier for the gateway. This parameter is required when you specify **-gateway** *local*. The default gateway identifier that is assigned is **GW1**. The gateway identifier must start with either an alphabetic character or an underscore character (`_`), and it can contain only the following types of characters: alphabetic, numeric, underscores (`_`), hyphens (`-`), and periods (`.`).

Gateways can also work in parallel to mutually take over in routing communications to the agents connected to them. To enable gateways to work in parallel, all gateways must have the same *gateway_id* assigned. This information is stored in the `JobManagerGW.ini` file, by setting the `JobManagerGWURIs` property.

-hostname host_ name

The fully qualified hostname or IP address on which the agent is contacted by the dynamic workload broker. The default is the hostname of this computer. If the hostname is a localhost, the hostname parameter must be specified.

-inst_dir installation_ dir

The directory of the IBM Workload Scheduler installation.

On Windows™ operating systems:

If you specify a path that contains blanks, enclose it in double quotation marks. Specify an absolute path. If you do not manually specify a path, the path is set to `%ProgramFiles%\IBM`

\TWA_TWS_USER, where *TWS_USER* is the user for which you are installing the IBM Workload Scheduler that you specify in the `-uname` option.

On UNIX™ and Linux™ operating systems:

If you specify a path that contains blanks, enclose it in double quotation marks. Specify an absolute path. If you do not manually specify a path, the path is set to:

- `/opt/IBM/TWA_TWS_USER`, if you logged in as the **root** user to install the agent. *TWS_USER* is the user that you specify in the `-uname` option and for which you are installing the agent (can omit if *TWS_USER* is **root**).



Note: The IBM Workload Scheduler user that you specify in the `-uname username` parameter must have read and run privileges for the `installation_dir` installation path; otherwise the installation fails.

- `home_dir/TWA`, if you logged in with a login other than **root**. Ensure that the directory permission is set to **755** for *home_dir*, the home directory for your login, and that you are the *home_dir* owner.

-jimport port_number

The JobManager port number used by the dynamic workload broker to connect to the IBM Workload Scheduler dynamic agent. The default value is **31114**. The valid range is from 1 to 65535.

-jimportssl true/false

The JobManager port used by the dynamic workload broker to connect to the IBM Workload Scheduler dynamic agent. The port value is the value of the `ssl_port` parameter in the `ita.ini` file if **-jimportssl** is set to `true`. If set to `false`, it corresponds to the value of the `tcp_port` parameter in the `ita.ini` file. The `ita.ini` file is located in `ITA\cpa\ita` on Windows™ systems and `ITA/cpa/ita` on UNIX™, Linux™, and IBM i systems.

Set the value to "true" if **-gateway** is set to `local`.

For communication using SSL or HTTPS

Set **jimportssl = true**. To communicate with the dynamic workload broker, it is recommended that you set the value to **true**. In this case, the port specified in **jimport** communicates in HTTPS.

For communication without using SSL or through HTTP

Set **jimportssl = false**. In this case the port specified in **jimport** communicates in HTTP.

-lang lang_id

The language in which the `twsinst` messages are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used. If neither **-lang** nor LANG are used, the default codepage is set to SBCS. For a list of valid values for these variables, see the following table:

Table 7. Valid values for -lang and LANG

Language	Value
Brazilian portuguese	pt_BR
Chinese (traditional and simplified)	zh_CN, zh_TW
English	en
French	fr
German	de
Italian	it
Japanese	ja
Korean	ko
Russian	ru
Spanish	es



Note: This is the language in which the installation log is recorded and not the language of the installed engine instance. twsinst installs all languages as default.

-master workstation

The workstation name of the master domain manager. This name cannot exceed 16 characters, cannot contain spaces, and cannot be the same as the workstation name that you entered in the **thiscpu** parameter. If not specified, the default value is **MASTER**.

-new

A fresh installation of the agent. Installs an agent and all supported language packs.

-password user_password

Windows™ systems only. The password of the user for which you are installing IBM Workload Scheduler. The password can include alphanumeric, dash (-), and underscore (_) characters, and the following symbols: (!)? =^*/~ [] \$`+;:~.@. The **-password** parameter is used for fresh installations only, it is not required for fix packs or upgrades.

-port port_number

The TCP/IP port number used by the Netman process to listen for communication from the master. The default value is **31111**. The valid range is from 1 to 65535. This port number is registered in the `localopts` file. For each installation you must specify a different number.

-reset_perm

UNIX™ and IBM i systems only. Reset the permission of the libraries in the `/usr/ibm` directory.

-restore

Run this command from the folder to where you copied the elmage (a folder other than the home directory of *TWS_USER*, where *TWS_USER* is the user that installed the IBM Workload Scheduler instance), and not from the installation path, to restore the version in the elmage.

-skip_usercheck

Enable this option if the authentication process within your organization is not standard, thereby disabling the default authentication option.

On Windows™ systems if you specify this parameter, the program does not create the user you specified in the `-uname username` parameter. If you specify this parameter you must create the user manually before running the script.

On UNIX™ and Linux™ systems if you specify this parameter, the program skips the check of the user in the `/etc/passwd` file or the check you perform using the `su` command.

-skipcheckprereq

If you specify this parameter, IBM Workload Scheduler does not scan system prerequisites before installing the agent. For more information on the prerequisite check, see [Scanning system prerequisites for IBM Workload Scheduler on page 52](#).

-sslkeyfolder *path*

The name and path of the local folder containing the certificates in `.PEM` format. The installation program generates the keystore and truststore files using the password you specify with the `-sslpassword` parameter.

tls.sth

The file storing your encoded password.

tls.rnd

The file containing the random seed to be used by OpenSSL.

ca.crt

The Certificate Authority (CA) public certificate.

tls.key

The private key for the instance to be installed.

tls.crt

The public part of the previous key.

You can optionally create a subfolder to contain one or more `*.crt` files to be added to the server truststore as trusted CA. This can be used for example to add to the list of trusted CAs the certificate of the LDAP server or DB2 server. Additionally, you can store here any intermediate CA certificate to be added to the truststore. The subfolder must be named **additionalCAs**.

If you use this parameter, ensure that the **addjruntime** parameter is set to true, because Java™ run time is required for defining custom certificates in .PEM format.

This parameter is mutually exclusive with the **wauther** and **wapassword** parameters, which are used to download and deploy the certificates already available on the master domain manager.

-sslpassword *password*

Specify the password for the certificates in .PEM format automatically generated by the installation program. If you use this parameter, ensure that the **addjruntime** parameter is set to true, because Java™ run time is required for defining custom certificates.

-tdwbhostname *host_name*

The fully qualified host name of the dynamic workload broker. It is used together with the **-agent** parameter set to either **dynamic** or **both** and the **-tdwbport *tdwbport_number*** parameter. It is necessary to install the dynamic agent. If not specified, you cannot run your workload dynamically and this parameter assumes the **localhost** default value. This value is registered in the **ResourceAdvisorUrl** property in the `JobManager.ini` file.

If you set the **-gateway** parameter to `remote`, this is the host name of the dynamic agent where the gateway resides and to which the agent connects. In this case, the **tdwbport** parameter must match the value of the **import** parameter specified when installing the agent with the local gateway. This information is stored in the `JobManager.ini` file.

-tdwbport *tdwbport_number*

The HTTP or HTTPS transport port number of the dynamic workload broker. It is used together with the **-agent** parameter set to either **dynamic** or **both** and the **-tdwbhostname *host_name*** parameter. It is required if you install the dynamic agent so that the agent can connect to the dynamic workload broker. This number is registered in the **ResourceAdvisorUrl** property in the `JobManager.ini` file. The default value is **31116**. For each installation you must specify a different port number. The valid range is from 0 to 65535. If you specify **0** or do not specify this parameter, you cannot run workload dynamically. Do not specify **0** if the **-agent** value is **dynamic** or **both**. The default is "0" for an upgrade, which means that this connection is not configured, otherwise, specify `31116` for a fresh installation.

If **gateway `remote`** is specified, then this is the HTTP or HTTPS port number of the dynamic agent where the gateway resides and to which the agent connects. You have specified this port with the **import** parameter when installing the agent with the local gateway. If you are performing a fresh installation, then the value to use is `31114`. This information is stored in the `JobManager.ini` file.

-thiscpu *workstation*

The name of the IBM Workload Scheduler workstation of this installation. The name cannot exceed 16 characters, cannot start with a number, cannot contain spaces, and cannot be the same as the workstation name of the master domain manager. This name is registered in the `localopts` file. If not specified, the default value is the host name of the workstation.

If the host name starts with a number, **-thiscpu** parameter must be specified.

-u

Displays command usage information and exits.

-uname *username*

The name of the user for which the IBM Workload Scheduler agent is being installed. This user owns the IBM Workload Scheduler instance and by default, jobs are run with its name. This user name is not to be confused with the user performing the installation. The user name cannot contain periods (.).

On UNIX™ and Linux™ systems, for a new installation, this user account must be created manually before running the installation and must be enabled to login to the machine where the agent is going to be installed. Create a user with a home directory. IBM Workload Scheduler is installed by default under the home directory of the specified user.

Dynamic agents can be installed on UNIX™ and Linux™ systems also by installers without **root** privileges. When this is the case:

- *username* takes by default the login name of the installer and **uname** can be omitted. If **uname** is specified with a different value than the login of the installer, an error message is returned.
- As a consequence, the agent can run jobs uniquely with the user name of the installer.
- Event Management triggers on files work only if the selected files are accessible to the user that was used for the installation.
- The user must be enabled to login to the machine where the agent is going to be installed

-wouser *wouser_name*

The user for which you have installed the master domain manager to which the agent is connecting. By providing this information, you enable IBM Workload Scheduler to download and deploy the certificates in **.PEM** format already available on the master domain manager in the `TWA_DATA_DIR/ssl/depot` path to enable secure communication. This parameter is mutually exclusive with the **sslkeyfolder** parameter, which is used to specify a folder on the agent where you store the certificates. This parameter applies to dynamic agents. To manage certificates for fault-tolerant agents, use the **sslkeyfolder** parameter.

-wapassword *wouser_password*

The password for the user for which you have installed the master domain manager to which the agent is connecting. By providing this information, you enable IBM Workload Scheduler to download and install the certificates in **.PEM** format already available on the master domain manager `TWA_DATA_DIR/ssl/depot` path to enable secure communication. This parameter is mutually exclusive with the **sslkeyfolder** parameter, which is used to specify a folder on the agent where you store the certificates. This parameter applies to dynamic agents. To manage certificates for fault-tolerant agents, use the **sslkeyfolder** parameter.

-work_dir *working_dir*

The temporary directory used by the program to deploy the installation process files.

On Windows™ operating systems:

If you specify a path that contains blanks, enclose it in double quotation marks. If you do not manually specify a path, the path is set to %temp%\TWA\twsversion_number, where %temp% is the temporary directory of the operating system.

On UNIX™ and Linux™ operating systems:

The path cannot contain blanks. If you do not manually specify a path, the path is set to /tmp/TWA/twsversion_number.

This parameter can also function as a backup directory during product upgrade with path WORKING_DIR/backup if you do not set the -skipbackup parameter to true.

-v

Displays the command version and exits.

Example installations

About this task

The following example shows the syntax used when using the **twinsinst** script to install a new instance of a fault-tolerant agent.

On Windows™ operating systems:

```
cscript twinsinst.vbs -new
-uname TWSuser1
-password user_password
-acceptlicense yes
-agent fta
-company IBM
-displayname thishostcomputername
-hostname thishostname.mycompany.com
-inst_dir "c:\Program Files\IBM\TWA_TWSuser1"
-master TWSmdm
-port 37124
-thiscpu fta92
```

On UNIX™ and Linux™ operating systems:

```
./twinsinst -new
-uname TWSuser1
-acceptlicense yes
-agent fta
-company IBM
-create_link
-hostname thishostname.mycompany.com
-inst_dir "/opt/IBM/TWA_TWSuser1"
-master TWSmdm
-port 37124
-reset_perm
-skipcheckprereq
-thiscpu fta92
-work_dir "/home/TWSuser1/tmp"
```

The following example shows the syntax used when using the **twinst** script to install a new instance of a dynamic agent and adding the Java™ run time for running job types with advanced options.

On Windows™ operating systems:

```
cscript twinst.vbs -new
  -uname TWSuser1
  -password user_password
  -acceptlicense yes
  -addjruntime true
  -agent dynamic
  -displayname thishostcomputername
  -hostname thishostname.mycompany.com
  -inst_dir "c:\Program Files\IBM\TWA_TWSuser1"
  -jport 31114
  -tdwport 31116
  -tdwhostname mainbroker.mycompany.com
```

On UNIX and Linux™ operating systems:

```
./twinst -new
  -uname TWSuser1
  -acceptlicense yes
  -addjruntime true
  -agent dynamic
  -displayname thishostcomputername
  -hostname thishostname.mycompany.com
  -inst_dir "/opt/IBM/TWA_TWSuser1"
  -jport 31114
  -reset_perm
  -skipcheckprereq
  -tdwport 31116
  -tdwhostname mainbroker.mycompany.com
```

The following example shows the syntax used when running the **twinst** script to install a new instance of both a fault-tolerant and a dynamic agent, and adding the Java™ run time for running job types with advanced options.

On Windows™ operating systems:

```
cscript twinst.vbs -new
  -uname TWSuser1
  -password user_password
  -acceptlicense yes
  -addjruntime true
  -agent both
  -displayname thishostcomputername
  -hostname thishostname.mycompany.com
  -inst_dir "c:\Program Files\IBM\TWA_TWSuser1"
  -jport 31114
  -master TWSmdm
  -tdwport 31116
  -tdwhostname mainbroker.mycompany.com
  -thiscpu mainworkstation
```

On UNIX™ and Linux™ operating systems:

```
./twinst -new
  -uname TWSuser1
```

```
-acceptlicense yes
-addjruntime true
-agent both
-create_link
-displayname thishostcomputername
-hostname thishostname.mycompany.com
-inst_dir "/opt/IBM/TWA_TWSuser1"
-jmport 31114
-master TWSmdm
-reset_perm
-skipcheckprereq
-tdwbpport 31116
-tdwbhostname mainbroker.mycompany.com
-thiscpu fta92
```

The following example shows the syntax used when using the **twinst** script to install a new instance of a dynamic agent, adding the Java™ run time for running job types with advanced options, and to install a gateway on the same workstation as the agent to enable communication with the master domain manager.

On Windows™ operating systems:

```
cscript twinst.vbs -new
-uname TWSuser1
-password user_password
-acceptlicense yes
-addjruntime true
-agent dynamic
-displayname thishostcomputername
-gateway local
-gwid gateway_id
-hostname thishostname.mycompany.com
-inst_dir "c:\Program Files\IBM\TWA_TWSuser1"
-jmport 31114
-jimportssl true
-master TWSmdm
-skipcheckprereq
-tdwbpport 31116
-tdwbhostname mainbroker.mycompany.com
-thiscpu mainworkstation
```

On UNIX™ and Linux™ operating systems:

```
./twinst -new
-uname TWSuser1
-acceptlicense yes
-addjruntime true
-agent both
-displayname thishostcomputername
-create_link
-gateway local
-gwid gateway_id
-hostname thishostname.mycompany.com
-inst_dir "/opt/IBM/TWA_TWSuser1"
-jmport 31114
-jimportssl true
-master TWSmdm
-reset_perm
-skipcheckprereq
```

```
-tdwbport 31116
-tdwbhostname mainbroker.mycompany.com
-thiscpu fta92
```

The following example shows the syntax used when downloading and deploying the certificates from the master domain manager to a dynamic agent. Ensure the certificates are available on the master domain manager in the `TWA_DATA_DIR/ssl/depot` path.

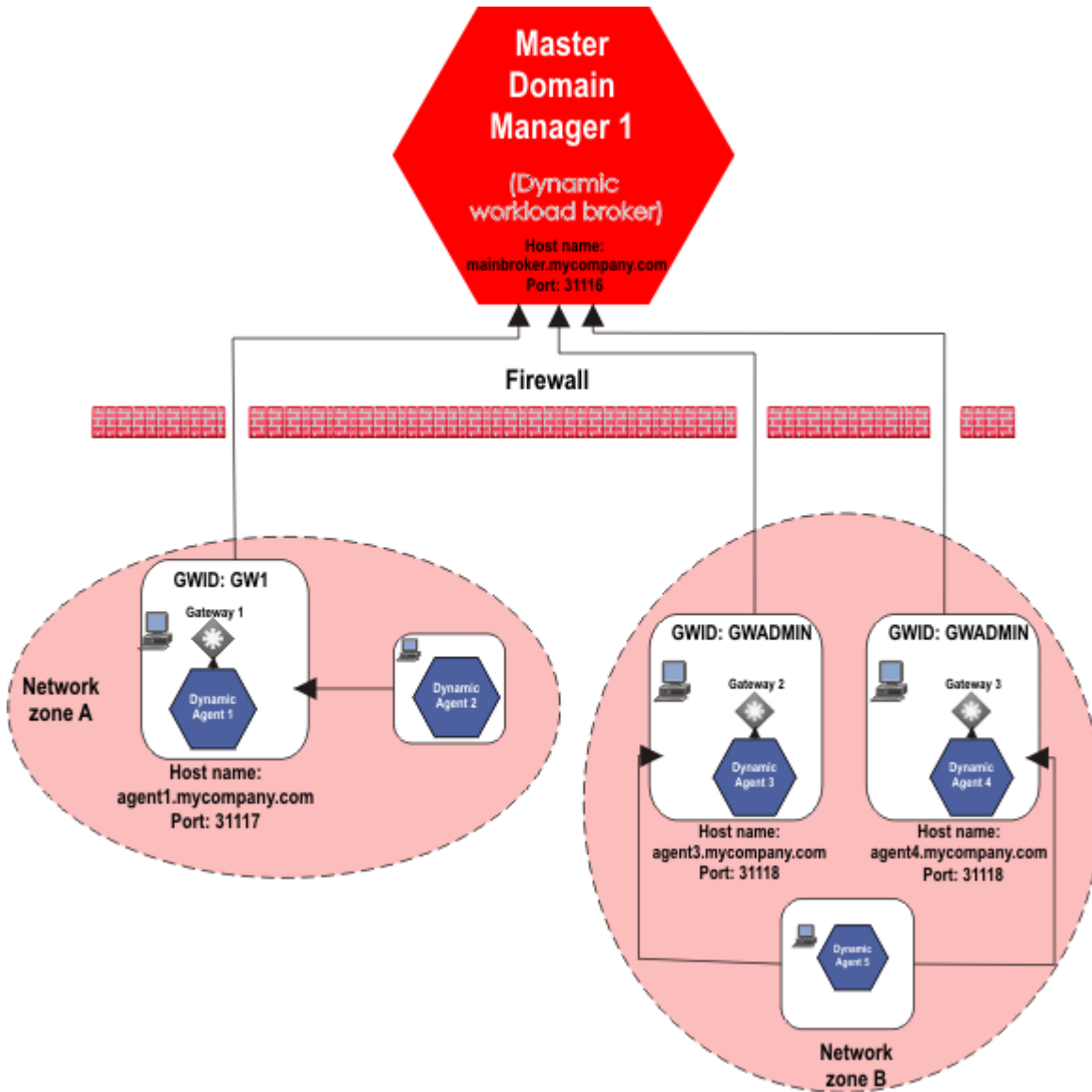
```
cscript twsinst.vbs -new
  -uname TWSuser1
  -password user_password
  -acceptlicense yes
  -addjruntime true
  -agent dynamic
  -displayname thishostcomputername
  -hostname thishostname.mycompany.com
  -inst_dir "c:\Program Files\HCL\TWA_TWSuser1"
  -jport 31114
  -tdwbport 31116
  -tdwbhostname mainbroker.mycompany.com
  -wuser wuser
  -wpassword password
```

```
./twsinst -new
  -uname TWSuser1
  -acceptlicense yes
  -addjruntime true
  -agent dynamic
  -displayname thishostcomputername
  -hostname thishostname.mycompany.com
  -inst_dir "/opt/HCL/TWA_TWSuser1"
  -jport 31114
  -reset_perm
  -skipcheckprereq
  -tdwbport 31116
  -tdwbhostname mainbroker.mycompany.com
  -wuser wuser
  -wpassword password
```

Dynamic agent gateway installation examples

Example installations for configuring a local or remote gateway with dynamic agent workstations in the same or different network zones.

The following examples address two installation scenarios and indicate the parameters to use with the `twsinst` script to install the dynamic agents to support the scenarios. The following figure depicts the two scenario environments:



Scenario 1: Same network zone

The workstations where you install the agents can communicate with each other (Dynamic Agent 1 and Dynamic Agent 2) and are located in the same network zone, but only one agent workstation (Dynamic agent 1) can connect to the dynamic workload broker.

Table 8. Installation syntax for agent installation with agents in the same network zone

Dynamic Agent workstation	Installation syntax
Dynamic Agent 1	<pre>twinsinst -new -uname <user_name> -password <user_password> -acceptlicense yes -agent dynamic -gateway local</pre>

Table 8. Installation syntax for agent installation with agents in the same network zone (continued)

Dynamic Agent workstation	Installation syntax
Dynamic Agent 2	<pre data-bbox="690 310 1459 726">-gwid GW1 -jmport 31117 -tdwbport 31116 -tdwbhostname mainbroker.mycompany.com -wauser wauser -wapassword password twsinst -new -uname <user_name> -password user_password> -acceptlicense yes -agent dynamic -gateway remote -tdwbport 31117 -tdwbhostname agent1.mycompany.com</pre>

where,

Dynamic Agent 1

-gateway local

Dynamic Agent 1 communicates with the dynamic workload broker through its local gateway.

-gwid GW1

The gateway ID is the name that identifies the gateway site on Dynamic Agent 1. The default name is GW1.

-tdwbport 31116

The port number of the dynamic workload broker.

-tdwbhostname mainbroker.mycompany.com

The fully qualified host name of the dynamic workload broker.

Dynamic Agent 2

-gateway remote

Indicates that Dynamic Agent 2 can connect to the internet through a gateway installed on a different agent, Dynamic Agent 1. Only for version 9.5 Fix Pack 4, ensure that Dynamic Agent 2 can connect directly to the MDM at installation time. This is required for downloading the certificates. (After the download has completed, you can return the agent to communicating through the gateway on Dynamic Agent 1.)

-tdwbport 31117

The port number of the dynamic agent workstation where the gateway resides. In this example, the port number of Dynamic Agent 1 is 31117.

-tdwbhostname agent1.mycompany.com

The fully qualified host name of the dynamic agent workstation where the gateway resides and to which the agent connects.

Scenario 2: Different network zones

The workstations where you install the agents cannot communicate with each other and are in different network zones (Network zone A and Network zone B), however, one agent workstation in each network zone can successfully connect to the dynamic workload broker. In Network zone B, two parallel gateways are configured.

Table 9. Installation syntax for agent installation with agents in different network zones

Dynamic Agent workstation	Installation syntax
Dynamic Agent 3	<pre> twsinst -new -uname <user_name> -password user_password -acceptlicense yes -agent dynamic -gateway local -gwid GWADMIN -jimport 31118 -tdwbport 31116 -tdwbhostname mainbroker.mycompany.com </pre>
Dynamic Agent 4	<pre> twsinst -new -uname <user_name> -password user_password -acceptlicense yes -agent dynamic -gateway local -gwid GWADMIN -jimport 31118 -tdwbport 31116 -tdwbhostname mainbroker.mycompany.com </pre>
Dynamic Agent 5	<pre> twsinst -new -uname <user_name> -password user_password -acceptlicense yes -agent dynamic -gateway remote -tdwbport 31118 -tdwbhostname agent4.mycompany.com </pre>

where,

Dynamic agent 3

-gateway local

Indicates that Dynamic Agent 3 can communicate with the dynamic workload broker directly, and a gateway is installed on Dynamic Agent 3 to route communications from dynamic agent workstations that cannot directly communicate with the dynamic workload broker.

-gwid GWADMIN

The gateway ID, GWADMIN, is the name that identifies the gateway on Dynamic Agent 3. Gateways with the same gateway_id can mutually take over in routing communications to the agents connected to them. Specify a different *<gateway_id>* if the gateways do not communicate with each other.

In addition, configure the two gateways in parallel to take over routing communications from the agents connected to them, should one of the gateways become unavailable. Edit the JobManagerGW.ini file on Dynamic agent 3 and set the JobManagerGWURIs property as follows:

```
JobManagerGWURIs = https://agent3.mycompany.com:31118/ita/JobManagerGW/
JobManagerRESTWeb/JobScheduler/resource,https://agent4.mycompany.com:
31118/ita/JobManagerGW/JobManagerRESTWeb/JobScheduler/resource
```

-tdwbport 31116

The port number of the dynamic workload broker.

-tdwbhostname mainbroker.mycompany.com

The fully qualified host name of the dynamic workload broker.

Dynamic agent 4**-gateway local**

Indicates that Dynamic Agent 4 can communicate with the dynamic workload broker directly, and a gateway is installed on Dynamic Agent 4 to route communications from dynamic agent workstations (Dynamic agent 5) that cannot directly communicate with the dynamic workload broker.

-gwid GWADMIN

The gateway ID, GWADMIN, is the name that identifies the gateway site on Dynamic Agent 4. Gateways with the same *<gateway_id>* can mutually take over in routing communications to the agents connected to them. Specify a different *<gateway_id>* if the gateways do not communicate with each other.

In addition, you can configure the two gateways in parallel to take over routing communications from the agents connected to them, should one of the gateways become unavailable. Edit the JobManagerGW.ini file on Dynamic agent 4 and set the JobManagerGWURIs property as follows:

```
JobManagerGWURIs = https://agent3.mycompany.com:31118/ita/JobManagerGW/
JobManagerRESTWeb/JobScheduler/resource,https://agent4.mycompany.com:
31118/ita/JobManagerGW/JobManagerRESTWeb/JobScheduler/resource
```

-tdwbport 31116

The port number of the dynamic workload broker.

-tdwbhostname mainbroker.mycompany.com

The fully qualified host name of the dynamic workload broker.

Dynamic agent 5

-gateway remote

Indicates that Dynamic Agent 5 can connect to the internet through a gateway installed on a different agent, Dynamic Agent 4.

-tdwbport 31118

The port number of the dynamic agent workstation where the gateway resides. In this example, the port number of Dynamic Agent 4 is 31118.

-tdwbhostname agent4.mycompany.com

The fully qualified host name of the dynamic agent workstation where the gateway resides and to which the agent connects.

For information about configuring dynamic agent communications through a gateway, see the *Administration Guide* in the sections Network administration > Network communications.

The twsinst log files

About this task

The twsinst log file name is:

On Windows operating systems:

```
<TWS_INST_DIR>\logs\twsinst_operating_system_TWS_user^version_number.log
```

Where:

TWS_INST_DIR

The IBM Workload Scheduler installation directory. The default installation directory is C :
\Program Files\IBM\TWA_TWS_user.

operating_system

The operating system.

TWS_user

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

On UNIX operating systems:

```
<TWS_INST_DIR>/TWSDATA/installation/logs/  
twsinst_operating_system_TWS_user^product_version_number.log
```

Where:

TWS_INST_DIR

The IBM Workload Scheduler installation directory. The default installation directory is `/opt/IBM/TWA_TWS_user`.

operating_system

The operating system.

TWS_user

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

Configuring a fault-tolerant agent

About this task

After installing a fault-tolerant agent, define the workstation in the database and link the workstation from the master. You can perform this task by using the Dynamic Workload Console or the command line interface. For information, see *User's Guide and Reference*. The following is an example of how to configure a fault-tolerant agent after installation using the command line interface:

1. Log in to the master domain manager as `TWS_user`.
2. Set the environment variables by running `twc_env.sh`.
3. Create the workstation definition in the IBM Workload Scheduler database. Open a command line window and enter the following commands:

```
composer
new
```

4. Type the workstation definition in the text editor. For example:

```
CPUNAME F235007_00
DESCRIPTION "fault-tolerant agent"
OS UNIX
NODE lab235007
TCPADDR 31111
DOMAIN MASTERDM
FOR MAESTRO
TYPE FTA
AUTOLINK ON
BEHINDFIREWALL OFF
FULLSTATUS OFF
END
```

Run `NjnextPlan` with the option **-for 0000** to add the agent workstation definition to the plan and to send the Symphony file to it. For more information about workstation definitions, see the section about workstation definition in *User's Guide and Reference*.



Note: Ensure that the global option `carryforward` is set to `all`, otherwise only incomplete job streams are carried forward.

- If you set the `autolink` parameter to `OFF`, issue the `link` command from the master domain manager to link the agent and to download the Symphony file to it:

```
conman "link workstation?"
```

- Change the workstation limit to allow jobs to run on the workstation. For example, set the number of jobs to run concurrently on the workstation to 10:

```
conman "limit F235007_00;10"
```

Additionally, the following configuration procedures might be necessary. For information about these procedures, see the relevant sections in *Administration Guide*:

- Customizing and configuring global, local, and user options.
- Customizing and configuring user authentication to allow users authorization on actions and objects, and to configure LDAP.
- Setting connection security to enable SSL or GSKit for inter-component communications.

Installing additional IBM Workload Scheduler components

This section describes how to install additional IBM Workload Scheduler components.

If you need to install more IBM Workload Scheduler components, for example if you need to add an additional component to an existing installation, you can perform the steps described in the relevant topic:

Installing an additional backup domain manager

Considerations about installing an additional backup domain manager



You can perform a typical installation, as described in the following scenario, or you can customize the installation parameters, as described in [FAQ - master domain manager and backup master domain manager customizations on page 97](#).

The backup domain manager shares the database with its master domain manager and requires a dedicated WebSphere Application Server Liberty Base, installed on the same workstation as the backup domain manager.

After installing a master domain manager, the administrator runs the `serverinst` command again to install a backup domain manager on a dedicated workstation. The backup domain manager is an agent that can assume the responsibilities of its master domain manager. The `serverinst` command connects to the database you specify, discovers that a master domain manager is already installed, and proceeds to install a backup domain manager.

You might want to install an additional backup domain manager for increased performance and reliability, for example you can move the event processor or the Dynamic Workload Console workload to the backup domain manager.

The IBM® Workload Scheduler administrator needs the following information, which is the same provided when installing the master domain manager, with the exception of the WebSphere Application Server Liberty Base installation directory, which is located on the workstation where you are installing the backup domain manager:

Table 10. Required information

Command parameter	Information type	Provided in...
Database information		
--rdbmstype	database type	Creating and populating the database on page 58
--dbhostname	database hostname	
--dbport	database port	
--dbname	database name	
--dbuser	database user name	
--dbpassword	database password	
IBM® Workload Scheduler information		
--wouser	IBM® Workload Scheduler administrative user name	Creating the IBM Workload Scheduler administrative user on page 91
--wapassord	IBM® Workload Scheduler administrative user password	
WebSphere Application Server Liberty Base information		
--wlpdir	WebSphere Application Server Liberty Base installation directory	Installing WebSphere Application Server Liberty Base on page 55

Before starting the backup domain manager installation, ensure the following steps have been completed:

1. [Installing WebSphere Application Server Liberty Base on page 55](#) on the workstation where you plan to install the backup domain manager.
2. [Encrypting passwords \(optional\) on page 57](#).
3. [Creating and populating the database on page 58](#) for the master domain manager. The backup domain manager shares the database with the master domain manager.
4. [Creating the IBM Workload Scheduler administrative user on page 91](#)
5. [Installing the master domain manager and backup master domain manager on page 92](#)

You can run the **serverinst** command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

Default values are stored in the `serverinst.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `serverinst.properties` file, but do not modify the `serverinst.template` file located in the same path.

To install the backup domain manager, perform the following steps:

1. Log in to the workstation where you plan to install as root.
2. Browse to the folder where the `serverinst` command is located in `image_location/TWS/interp_name`.
3. Start the installation specifying a minimum set of parameters. In this case, default values are used for all remaining parameters:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --rdbmstype <db_type>
--dbhostname <db_hostname> --dbport <db_port> --dbname <db_name>
--dbuser <db_user> --dbpassword <db_password> --wuser <wa_user>
--wapassword <wa_password> --wlpdir <Liberty_installation_dir>
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --rdbmstype <db_type>
--dbhostname <db_hostname> --dbport <db_port> --dbname <db_name>
--dbuser <db_user> --dbpassword <db_password> --wuser <wa_user>
--wapassword <wa_password> --wlpdir <Liberty_installation_dir>
```

4. To verify that the installation completed successfully, browse to the directory where you installed the backup domain manager and type the following commands:

```
./twc_env.sh
optman ls
```

This command lists the IBM® Workload Scheduler configurations settings and confirms that IBM® Workload Scheduler installed correctly.

You have now successfully installed the backup domain manager.

If you want to customize more installation parameters, see [FAQ - master domain manager and backup master domain manager customizations on page 97](#).

Installing dynamic domain components

Procedure to install the dynamic domain manager and backup dynamic domain manager



A dynamic domain manager is the management hub in a domain running both static and dynamic workload. All communications to and from the dynamic agents in the domain are routed through the dynamic domain manager.

The following topics describe the required steps.

The following topics describe the required steps:

1. [Installing WebSphere Application Server Liberty Base on page 129](#)
2. [Encrypting passwords \(optional\) on page 130](#)
3. [Creating and populating the database for the dynamic domain manager on page 131](#)
4. [Creating the IBM Workload Scheduler administrative user on page 134](#)
5. [Installing the dynamic domain manager and backup dynamic domain manager on page 135](#)

Installing WebSphere Application Server Liberty Base

WebSphere Application Server Liberty Base is required on all workstations where you plan to install the master components and the Dynamic Workload Console.

Before you begin



Ensure that your system meets the operating system and Java requirements. For more information, see WebSphere Application Server Liberty Base detailed system requirements.

About this task

You can quickly install WebSphere Application Server Liberty Base by extracting an archive file on all supported platforms.

Install WebSphere Application Server Liberty Base on all of the following workstations, which comprise a typical installation:

- master domain manager
- backup domain manager
- two Dynamic Workload Console installations on two separate workstations

To extract the archive, you can use your own Java Ext or use the Java Ext provided with the IBM® Workload Scheduler image. The provided Java Ext is located in the following path in the image for your operating system:

```
IMAGE_DIR/TWS/INTERP/Tivoli_Eclipse_INTERP/TWS/JavaExt.
```

To install WebSphere Application Server Liberty Base, perform the following steps:

1. Download WebSphere Application Server Liberty Base from [Recommended updates for WebSphere Application Server Liberty](#).

Each WebSphere Application Server Liberty Base image is packaged as a jar file named

```
wlp-base-all-fix_pack.jar
```



Note: To update IBM® Workload Scheduler to version 9.5 Fix Pack 6, the minimum required version of WebSphere® Liberty is 22.0.0.3 or later.

2. Install WebSphere Application Server Liberty Base by extracting the archive file to a directory of your choice.

On Windows operating systems

```
java -jar liberty_download_dir\wlp-base-all-fix_pack.jar
--acceptLicense install_dir
```

On UNIX operating systems

```
java -jar liberty_download_dir/wlp-base-all-fix_pack.jar
--acceptLicense install_dir
```

where:

liberty_download_dir

The directory where you downloaded WebSphere Application Server Liberty Base.

install_dir

The directory where you want to install WebSphere Application Server Liberty Base.



Note: Note that the value of the *install_dir* parameter must match the value to be defined for the **wlpdir** parameter when installing the master domain manager and its backup, dynamic domain manager and its backup, and the Dynamic Workload Console.

3. Ensure the IBM® Workload Scheduler administrative user that you created has the rights to run WebSphere Application Server Liberty Base and full access to the installation directory. If WebSphere Application Server Liberty Base is shared between the master domain manager and the Dynamic Workload Console, ensure also the Dynamic Workload Console user has the same rights.

Results

You have now successfully installed WebSphere Application Server Liberty Base.

What to do next

You can now proceed to [Encrypting passwords \(optional\) on page 130](#).

Encrypting passwords (optional)

How to encrypt passwords required by the installation process

About this task



Before you start the installation process, you can optionally encrypt the passwords you will use while installing, upgrading, and managing IBM® Workload Scheduler. The encryption mechanism is based on your WebSphere Application Server Liberty Base installation. You can use either the **{xor}** or **{aes}** encoding. For more information, see [Liberty: The limits to protection through password encryption](#).

To encrypt the passwords, proceed as follows:

1. Open a shell command line.
2. Set the JAVA_HOME environment variable. If you do not have Java installed, you can optionally use the Java version provided with the IBM® Workload Scheduler installation image and available in .

IBM® Workload Scheduler

```
<IMAGE_DIR>/TWS/platform/Tivoli_Eclipse_platform>TWS/JavaExt/jre/
```

Dynamic Workload Console

```
<DWC_IMAGE_DIR>/java/jre/bin
```

3. Browse to the following path:

```
<Liberty_installation_dir>/bin
```

4. You can encrypt passwords using either of the following methods:

{xor}

```
securityUtility encode my_password>
```

{aes}

```
securityUtility encode --encoding=aes my_password>
```

Result

An output similar to the following is returned:

xor format

```
{xor}MjY+Lz4sbnGRLTs=
```

aes format

```
{aes}AFC3jj9cR0YyqR+3CONBzVi8deLb2Bossb9GGroh8UmDPGikIkzXZzid3nzY0IhnSg==
```

5. Provide the encrypted passwords when typing the commands or save them in the properties file for each command.

What to do next

You can now proceed to [Creating and populating the database for the dynamic domain manager on page 131](#).

Creating and populating the database for the dynamic domain manager

Instructions for creating and populating the IBM® Workload Scheduler database for the dynamic domain manager

About this task



The procedure for creating the database for the dynamic domain manager is identical to that of the master domain manager, with the exception that an additional parameter, `component_type`, must be passed to the script.

For the complete procedure for creating and populating the database, see [Creating and populating the database on page 58](#), then select the procedure related to the database you are using.

To create a DB2 database for the dynamic domain manager submit the following command:

On Windows operating systems

```
cscript configureDb.vbs --componenttype DDM --dbhostname db_hostname
--dbport db_port --dbname db_name --dbuser db_user
--dbpassword db_password --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
```

On UNIX operating systems

```
./configureDb.sh --componenttype DDM --dbhostname db_hostname
--dbport db_port --dbname db_name --dbuser db_user
--dbpassword db_password --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
```

To create an Oracle database for the dynamic domain manager submit the following command:

On Windows operating systems

```
cscript configureDb.vbs --componenttype DDM --rdbmstype ORACLE
--dbname service_name --dbuser db_user --dbpassword db_password
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
```

On UNIX operating systems

```
./configureDb.sh --componenttype DDM --rdbmstype ORACLE
--dbname service_name --dbuser db_user --dbpassword db_password
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
```

To create an Informix database for the dynamic domain manager submit the following command:

On UNIX operating systems

```
./configureDb.sh --componenttype DDM --rdbmstype IDS
--dbname db_name --dbuser db_user --dbpassword db_password
--dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
```

To create an MSSQL database for the dynamic domain manager submit the following command:

On Windows operating systems

```
cscript configureDb.vbs --componenttype DDM --rdbmstype MSSQL
--dbname db_name --dbhostname db_hostname
```

```
--dbadminuser db_administrator
--dbadminuserpw db_administrator_password
```

On UNIX operating systems

```
./configureDb.sh --componenttype DDM --rdbmstype MSSQL
--dbname db_name --dbhostname db_hostname
--dbadminuser db_administrator
--dbadminuserpw db_administrator_password
```

where:

--componenttype

The IBM® Workload Scheduler for which the database is installed. When installing a dynamic domain manager, specify **DDM**.

--dbhostname db_hostname

The host name or IP address of database server.

--dbport db_port

The port of the database server.

--dbname db_name

The name of the IBM® Workload Scheduler database. Note that this name must match the name specified in the `serverinst` command. For more information about the `serverinst` command, see [Master components installation - serverinst script on page 357](#). When creating the database on Oracle, this parameter indicates the service name.

--dbuser db_user

The user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--dbpassword db_password

The password for the user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--dbadminuser db_admin_user

The database administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--dbadminuserpw db_admin_password

The password of the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

The same criteria apply when creating the database for all supported databases. For more information about creating the database for each supported vendor, see:

- [Creating and populating the database for DB2 for the master domain manager on page 60](#)
- [Creating the database for Oracle for the master domain manager on page 68](#)

- [Creating the database for Informix or OneDB for the master domain manager on page 72](#)
- [Creating the database for MSSQL for the master domain manager on page 75](#)

Results

You have now successfully created and populated the IBM® Workload Scheduler database.

What to do next

You can now proceed to [Creating the IBM Workload Scheduler administrative user on page 134](#).

Creating the IBM® Workload Scheduler administrative user

Instructions to create the IBM® Workload Scheduler administrative user



IBM® Workload Scheduler administrative user

The IBM® Workload Scheduler administrator creates the administrative user (**wauser**). The administrative user is the user for which the product will be installed in the subsequent steps. This implies that this user has full access to all scheduling objects.

The user name can contain alphanumeric, dash (-), and underscore (_) characters; it cannot contain national characters. The first character of the user name must be a letter.

The following considerations apply:

On Windows operating systems:

- If this user account does not already exist, it is automatically created at installation time.
- If installing on a Windows™ server in a domain, do not define a domain and local ID with the same user name.
- If you specify a domain user, define the name as *domain_name\user_name*.
- If you specify a local user, define the name as *system_name\user_name*. Type and confirm the password.

On UNIX and Linux operating systems:

This user account must be created manually before running the installation and must be enabled to login to the machine where the master domain manager is going to be installed. Create a user with a home directory and group. Use the appropriate UNIX and Linux operating system commands to create the user.

For more information, see [IBM Workload Scheduler user management on page 50](#).

What to do next

You can now proceed to [Installing the dynamic domain manager and backup dynamic domain manager on page 135](#).

Installing the dynamic domain manager and backup dynamic domain manager

Considerations about installing the dynamic domain manager and backup dynamic domain manager



A dynamic domain manager is the management hub in a domain running both static and dynamic workload. All communications to and from the dynamic agents in the domain are routed through the dynamic domain manager.

The dynamic domain manager and backup dynamic domain manager require a dedicated database and a dedicated WebSphere Application Server Liberty Base.

The procedure to install the dynamic domain manager and backup dynamic domain manager is exactly the same, with the difference that it is performed on two different workstations and that each installation points to its local WebSphere Application Server Liberty Base installation. IBM® Workload Scheduler determines whether or not a dynamic domain manager is already present in the environment and proceeds to install a dynamic domain manager or backup dynamic domain manager accordingly.

The IBM® Workload Scheduler administrator installs the dynamic domain manager and backup dynamic domain manager. He needs the following information:

Table 11. Required information

Command parameter	Information type	Provided in...
Database information		
--rdbmstype	database type	Creating and populating the database for the dynamic domain manager on page 131
--dbhostname	database hostname	
--dbport	database port	
--dbname	database name	
--dbuser	database user name	
--dbpassword	database password	
IBM® Workload Scheduler information		
--wouser	IBM® Workload Scheduler administrative user name	Creating the IBM Workload Scheduler administrative user on page 134 and Installing the master domain manager and backup master domain manager on page 92
--wapassord	IBM® Workload Scheduler administrative user password	

Table 11. Required information

(continued)

--master	The master domain manager name	
--mdmbrokerhostname	The fully qualified host name or IP address of the master domain manager contacted by the dynamic domain manager.	
--mdmhttpsport	The port of the master domain manager host used by the broker to contact master domain manager.	
WebSphere Application Server Liberty Base information		
--wlpdir	WebSphere Application Server Liberty Base installation directory	Installing WebSphere Application Server Liberty Base on page 129

Before starting the installation, ensure the following steps have been completed:

1. [Installing WebSphere Application Server Liberty Base on page 129](#) on the workstation where you plan to install the dynamic domain manager and on the workstation where you plan to install the backup dynamic domain manager.
2. [Encrypting passwords \(optional\) on page 130](#).
3. [Creating and populating the database for the dynamic domain manager on page 131](#)
4. [Creating the IBM Workload Scheduler administrative user on page 134](#)

You can run the **serverinst** command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

Default values are stored in the `serverinst.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `serverinst.properties` file, but do not modify the `serverinst.template` file located in the same path.

To install the dynamic domain manager, perform the following steps:

1. Log in to the workstation where you plan to install as root.
2. Browse to the folder where the `serverinst` command is located:

On Windows operating systems

`image_location\TWS\interp_name`

On UNIX operating systems

`image_location/TWS/interp_name`

3. . Start the installation specifying a typical set of parameters. In this case, default values are used for all remaining parameters:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --rdbmstype db_type
--dbhostname db_hostname --dbport db_port --dbname db_name
--dbuser db_user --dbpassword db_password --wouser wa_user
--wapassword wa_password --componenttype DDM --domain domain_name
--master mdm_name --mdmbrokerhostname mdm_broker_host_name
--mdmhttpsport mdm_https_host_name --wlpdir Liberty_installation_dir\wlp
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --rdbmstype db_type
--dbhostname db_hostname --dbport db_port --dbname db_name
--dbuser db_user --dbpassword db_password --wouser wa_user
--wapassword wa_password --componenttype DDM --domain domain_name
--master mdm_name --mdmbrokerhostname mdm_broker_host_name
--mdmhttpsport mdm_https_host_name --wlpdir Liberty_installation_dir/wlp
```

Repeat the same procedure on the workstation where you plan to install the backup dynamic domain manager

You have now successfully installed the dynamic domain manager and backup dynamic domain manager.

For more information about all **serverinst** parameters and default values, see [Master components installation - serverinst script on page 357](#).

Installing agents on IBM i systems

Learn how to install agents on IBM i systems.

About this task

You install the IBM Z Workload Scheduler Agent and dynamic agent on IBM i systems by using the `twsinst` installation script.

To install an agent, complete the following steps:

1. Sign on as **QSECOFR** user.
2. Create an IBM i user profile for which the IBM Workload Scheduler agent is installed.



Note: The user profile is not the same as for the user that is performing the installation logged on as **QSECOFR**. Instead the user profile is for the user that you specify in the **-uname** *username* parameter when running the `twsinst` script. For descriptions of the syntax parameters, see [Agent installation parameters on IBM i systems on page 140](#). You cannot use an existing IBM i system user profile, an application supplied user profile, or any of the following reserved IBM i user profiles:

- QDBSHR
- QDFTOWN
- QDOC
- QLPAUTO
- QLPINSTALL



- QRJE
- QSECOFR
- QSPL
- QSYS
- QTSTRQS



Attention: Be aware of the following considerations:

- If the user profile is a member of a group, the installation fails. Set the group profile that is associated with the user profile to **NONE*.
- If the *username* is longer than 8 characters, after the installation the agent (and the JobManager component) runs under the **QSECOFR** user instead of under the authority of the installation user. To prevent this problem, set the `PASE_USRGRP_LIMITED` environment variable to N.

3. On the IBM i system, verify that no library exists with the same name as the user profile supplied for the agent user.
4. Download the IBM i agent elmage from [IBM Passport Advantage](#). For more information about the installation media, see the section about installation media in *Planning and Installation Guide* or the Download Document at [IBM Workload Scheduler download document](#).
5. To untar or unzip the agent elmage, you can use the *PASE* shell or the *AIXterm* command.

Using PASE shell:

- a. Open the *PASE* shell.
- b. Run the command "CALL QP2TERM".
- c. Locate the folder where you downloaded the agent elmage and run the command:

IBM Z Workload Scheduler Agent

```
"tar xvf TWSversion_number>_IBM_I.tar"
```

Dynamic Agent

```
"unzip TWSversion_number>_IBM_I.zip"
```

- d. Exit from the *PASE* shell.

Using AIXterm command:

- a. Start the *Xserver* on your desktop.
- b. On the iSeries machine, open a *QSH shell* and export the display.
- c. In *QSH shell*, go to the directory */QopenSys* and run the command "aixterm -sb".
- d. A pop-up window is displayed on your desktop. By Using this pop-up window, unzip the *TWSversion_number>_IBM_I.zip* file, or untar the *TWSversion_number>_IBM_I.tar* file.

6. If your machine's primary language is other than English, carry out these steps:
 - a. Add English as secondary language.
 - b. Ensure that when connecting to the environment the Host Code-Page is set to 037
 - c. Before starting the installation, verify that the *Qshell session* is configured correctly and type the following command in the <yourfilename> :

```
echo " key key2 " | sed 's/ *$//g' | sed 's/^ *//g'
```

- d. Run the <yourfilename>
 - e. The environment is configured in the correct way if the output is: "key key2".
7. Open a *QSH shell* and run the `twinst` script. During the installation process, the product creates an IBM i library and a job description with the same name as the user profile created in Step 2 on page 137.

The installation procedure adds this library to the user profile library list of the dynamic agent user profile and sets this job description as the job description of the dynamic agent user profile. By default, the software is installed in the user's home directory.



Note: If you do not run the `twinst` script from a *QSH shell* the installation fails.

If the installation fails to understand the cause of the error, see [Analyzing return codes for agent installation, upgrade, restore, and uninstallation on page 145](#).

After a successful installation, perform the following configuration task:

- [Configuring a dynamic agent on page 188](#), as described in *IBM Workload Scheduler: Planning and Installation*.

Command usage and version

Show command usage and version

```
twinst -u | -v
```

Install a new instance

```
twinst -new -uname username
  -acceptlicense yes|no
  [-addjruntime true|false]
  [-agent dynamic]
  [-company company_name]
  [-displayname agentname]
  [-gateway local|remote|none]
  [-gweifport gateway_eif_port]
  [-gwid gateway_id]
  [-hostname hostname]
  [-inst_dir install_dir]
  [-jimport port_number]
  [-jimportssl true|false]
  [-lang lang_id]
  [-tdwbport tdwbport_number]
  [-tdwbhostname host_name]
  [-work_dir working_dir]
```

For a description of the installation parameters and options that are related to agent on this operating system, see [Agent installation parameters on IBM i systems on page 140](#) in *IBM Workload Scheduler: Planning and Installation*.

Prerequisites

Describes the prerequisites for running the IBM i agent.

About this task

To install and use the IBM i agent you must have a supported version of the IBM i operating system. For a detailed list of supported operating systems, see the Detailed System Requirements document at [IBM Workload Scheduler Detailed System Requirements](#).

Scanning system prerequisites on IBM i systems

Scanning system prerequisites on IBM i systems

About this task

Before you install or upgrade the agent, IBM Workload Scheduler automatically runs a scan on your system. Having an environment that meets the product system requirements ensures that the installation or upgrade succeeds without any delays or complications.

The scan verifies that:

- The operating system is supported for the product.
- There is enough permanent and temporary disk space to install both the product and its prerequisites.
- There is enough memory and virtual memory swap space.



Note: The scan verifies only that the environment meets the requirements of IBM Workload Scheduler.

If any of these checks fails, IBM Workload Scheduler performs the following action:

- An error message is returned. Analyze the log file, solve the error, and rerun the installation or upgrade. The log file is in `%TEMP%\TWA\tws95\result.txt`
- You can decide to rerun the installation or upgrade without executing the prerequisite scan. If you specify the **-skipcheckprereq** parameter, the `twinsinst` installation script does not execute the prerequisite scan. For more information about the `-skipcheckprereq` option, see [Agent installation parameters - twinsinst script on page 108](#).

For a detailed list of supported operating systems and product prerequisites, see [IBM Workload Scheduler Detailed System Requirements](#).

Agent installation parameters on IBM i systems

About this task

The parameters set when using the **twinsinst** script to install the dynamic agent on IBM i systems.

-acceptlicense *yes/no*

Specify whether to accept the License Agreement.

-addjruntime *true/false*

Adds the Java™ run time to run job types with advanced options, both those types that are supplied with the product and the additional types that are implemented through the custom plug-ins. Valid values are **true** and **false**. The default for a fresh installation is **true**. Set this parameter to true if you use the **sslkeyfolder** and **sslpassword** parameters to define custom certificates in **.PEM** format.

This option is applicable to both fault-tolerant agents and dynamic agents.

If you decided not to install Java™ run time at installation time, you can still add this feature later as it is described in [Adding a feature on page 196](#).

-company *company_name*

The name of the company. The company name cannot contain blank characters. The name is shown in program headers and reports. If not specified, the default name is COMPANY.

-displayname *name*

The name to assign to the agent. The name cannot start with a number. The default is the host name of this computer.

If the host name starts with a number, **-displayname** parameter must be specified.

-gateway *local/remote/none*

Specifies whether to configure a gateway to communicate with the dynamic workload broker or not, and how it is configured. Specify *local* if the gateway is local to the dynamic agent workstation. Specify *remote* if the dynamic agent communicates through a gateway that is installed on a different dynamic agent workstation from the dynamic agent being installed. Only for version 9.5 Fix Pack 4, if you set **-gateway** to remote and want to install the agent in SSL mode, ensure that the agent can connect directly to the MDM at installation time. This is required only for the time interval necessary for downloading the certificates. (After the download has completed, you can return the agent to communicating through the gateway). The default value is *none*, no gateway is configured.

-gweifport *gateway_elf_port*

Specifies the Job Manager Event Integration Facility (EIF) port number. The default value is **31132**. The valid range is 1 to 65535.

-gwid *gateway_id*

The unique identifier for the gateway. This parameter is required when you specify **-gateway *local***. The default gateway identifier that is assigned is **GW1**. The gateway identifier must start with either an alphabetic character or an underscore character (), and it can contain only the following types of characters: alphabetic, numeric, underscores (), hyphens (-), and periods (.).

Gateways can also work in parallel to mutually take over in routing communications to the agents connected to them. To enable gateways to work in parallel, all gateways must have the same *gateway_id* assigned. This information is stored in the `JobManagerGW.ini` file, by setting the `JobManagerGWURIs` property.

-hostname *host_name*

The fully qualified hostname or IP address on which the agent is contacted by the dynamic workload broker. The default is the hostname of this computer. If the hostname is a localhost, the `hostname` parameter must be specified.

-inst_dir *installation_dir*

The directory of the IBM Workload Scheduler installation. Specify an absolute path. The path cannot contain blanks. If you do not manually specify a path, the path is set to the default home directory, that is, the *home/username* directory, where *username* is the value specified in the `-uname` option.

-jimport *port_number*

The JobManager port number used by the dynamic workload broker to connect to the IBM Workload Scheduler dynamic agent. The default value is **31114**. The valid range is from 1 to 65535.

-jimportssl *true/false*

The JobManager port used by the dynamic workload broker to connect to the IBM Workload Scheduler dynamic agent. The port value is the value of the `ssl_port` parameter in the `ita.ini` file if **-jimportssl** is set to `true`. If set to `false`, it corresponds to the value of the **tcp_port** parameter in the `ita.ini` file. The `ita.ini` file is located in `ITA\cpa\ita` on Windows™ systems and `ITA/cpa/ita` on UNIX™, Linux™, and IBM i systems.

Set the value to "true" if **-gateway** is set to `local`.

For communication using SSL or HTTPS

Set **jimportssl = true**. To communicate with the dynamic workload broker, it is recommended that you set the value to `true`. In this case, the port specified in **jimport** communicates in HTTPS.

For communication without using SSL or through HTTP

Set **jimportssl = false**. In this case the port specified in **jimport** communicates in HTTP.

-lang *lang_id*

The language in which the `twsinst` messages are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used. If neither **-lang** nor LANG are used, the default codepage is set to SBCS. For a list of valid values for these variables, see the following table:

Table 12. Valid values for -lang and LANG parameter

Language	Value
Brazilian portuguese	pt_BR
Chinese (traditional and simplified)	zh_CN, zh_TW

Table 12. Valid values for `-lang` and `LANG` parameter (continued)

Language	Value
English	en
French	fr
German	de
Italian	it
Japanese	ja
Korean	ko
Russian	ru
Spanish	es



Note: This is the language in which the installation log is recorded and not the language of the installed engine instance. `twinsinst` installs all languages as default.

-new

A fresh installation of the agent. Installs an agent and all supported language packs.

-skip_usercheck

Enable this option if the authentication process within your organization is not standard, thereby disabling the default authentication option. If you specify this parameter, you must create the user manually before running the script.

-skipcheckprereq

If you specify this parameter, IBM Workload Scheduler does not scan system prerequisites before installing the agent.

For a detailed list of supported operating systems and product prerequisites, see [IBM Workload Scheduler Detailed System Requirements](#).

-sslkeyfolder

The name and path of the folder containing the certificates in .PEM format. The installation program generates the keystore and truststore files using the password you specify with the `--sslpassword` parameter. If you use this parameter, ensure that the `addjruntime` parameter is set to true, because Java™ run time is required for defining custom certificates.

-sslpassword

Specify the password for the certificates automatically generated by the installation program. If you use this parameter, ensure that the `addjruntime` parameter is set to true, because Java™ run time is required for defining custom certificates.

-tdwbhostname *host_name*

The fully qualified host name of the dynamic workload broker. It is used together with the **-agent *dynamic*** and the **-tdwbport *tdwbport_number*** parameters. If not specified, you cannot run your workload dynamically and this parameter uses the **localhost** default value. This value is registered in the **ResourceAdvisorUrl** property in the `JobManager.ini` file.

If you set the **-gateway** parameter to `remote`, this is the host name of the dynamic agent where the gateway resides and to which the agent connects. In this case, the **tdwbport** parameter must match the value of the **jimport** parameter specified when installing the agent with the local gateway. This information is stored in the `JobManager.ini` file.

-tdwbport *tdwbport_number*

The dynamic workload broker HTTP or HTTPS transport port number. It is used together with the **-agent *dynamic*** and the **-tdwbhostname *host_name*** parameters. The valid range is from 0 to 65535. If you specify **0** or do not specify this parameter, you cannot run workload dynamically. Do not specify **0** if the **-agent** value is **dynamic**. This number is registered in the **ResourceAdvisorUrl** property in the `JobManager.ini` file. The default value is **41114**.

If **gateway *remote*** is specified, then this is the HTTP or HTTPS port number of the dynamic agent where the gateway resides and to which the agent connects. You have specified this port with the **jimport** parameter when installing the agent with the local gateway.. If you are performing a fresh installation, then the value to use is `31114`. This information is stored in the `JobManager.ini` file.

-thiscpu *workstation*

The name of the IBM Workload Scheduler workstation of this installation. The name cannot exceed 16 characters, cannot start with a number, cannot contain spaces, and cannot be the same as the workstation name of the master domain manager. This name is registered in the `localopts` file. If not specified, the default value is the host name of the workstation.

If the host name starts with a number, **-thiscpu** parameter must be specified.

-u

Displays command usage information and exits.

-uname *username*

The name of the user for which IBM Workload Scheduler is installed.



Note: This user name is not the same as the user performing the installation logged on as **QSECOFR**.

If *username* is longer than 8 characters, after installation the agent (and the JobManager component) erroneously run under the **QSECOFR** user, instead of under the authority of the installation user. To prevent this, set the `PASE_USRGRP_LIMITED` environment variable to `N`.

-work_dir working_dir

The temporary directory used for the IBM Workload Scheduler installation process files deployment. The path cannot contain blanks. If you do not manually specify a path, the path is set to `/tmp/TWA/twsversion_number`.

-v

Displays the command version and exits.

Example installation of an agent on IBM i systems

About this task

The following example shows the syntax used when using the **twsinst** script to install a new instance of the agent on an IBM i system.

```
./twsinst -new
-uname TWS_user
-acceptlicense yes
-hostname thishostname.mycompany.com
-jmport 31114
-tdwbport 41114
-tdwbhostname mainbroker.mycompany.com
-work_dir "/tmp/TWA/tws93"
```

The twsinst script log files on IBM i systems

About this task

The twsinst log file name is:

```
<TWS_INST_DIR>/twsinst_IBM_i_TWS_user^product_version.log
```

Where:

TWS_INST_DIR

The IBM Workload Scheduler installation directory. The default installation directory is `/home/TWS_user`.

TWS_user

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

product_version

Represents the product version. For example, for version 9.5 of the product, the value is 9.5.0.00

Analyzing return codes for agent installation, upgrade, restore, and uninstallation

Check how your operation completed by analyzing the return codes that are issued by twsinst.

Return codes that you can receive when you are installing, upgrading, restoring, or uninstalling agents. To analyze them and take corrective actions, run the following steps:

On Windows operating systems

1. Display the operation completion return code, by using the following command:

```
echo %ERRORLEVEL%
```

2. Analyze the following table to verify how the operation completed:

Table 13. Windows operating system agent return codes

Error Code	Description	User action
0	Success: The operation completed successfully without any warnings or errors.	None.
1	Generic failure	Check the messages that are displayed on the screen by the script. Correct the error and rerun the operation. If the error persists, search the https://www.ibm.com/support/home/ database for a solution.
2	The installation cannot create the IBM Workload Scheduler user or assign the correct permission to it.	Verify the operating system policies and configuration. Verify the input values. If necessary, create the user manually before you run the installation.
3	The password is not correct or the installation cannot verify it.	Verify the operating system policies and configuration. Verify the input values.
4	The IBM Workload Scheduler installation directory is not empty. You specified as installation folder a directory that exists.	Empty it or specify a different directory.
5	An error occurred checking the IBM Workload Scheduler prerequisites on the workstation.	See the System Requirements Document at IBM Workload Scheduler Detailed System Requirements .
6	The IBM Workload Scheduler registry is corrupted.	Use the <code>recovInstReg</code> option to recover the registry. Then, rerun the operation.
7	The upgrade or restore operation cannot retrieve the information from the configuration files.	Check that the previous installation and the <code>localopts</code> , the <code>globalopts</code> , the <code>ita.ini</code> , and the <code>JobManager.ini</code>

Error Code	Description	User action
		files are not corrupted. Correct the errors and try again the operation.
8	The upgrade, restore, or uninstallation cannot proceed because there are jobs that are running.	Stop the jobs that are running or wait for these jobs to complete. Restart the operation.
9	The upgrade, restore, or uninstallation cannot proceed because there are files that are locked.	Stop all the processes that are running and close all the activities that can block the installation path. Restart the operation.
10	The upgrade, restore, or uninstallation cannot proceed because there are command lines opened.	Close the command lines. Restart the operation.

On UNIX and Linux operating systems:

1. Display the installation completion return code, by using the following command:

```
echo $?
```

2. Analyze the following table to verify how the installation completed:

Table 14. UNIX or Linux operating system agent return codes

Error Code	Description	User action
0	Success: The installation completed successfully without any warnings or errors.	None.
1	Generic failure.	Check the messages that are displayed on the video by the script. Correct the error and rerun the operation. If the error persists, search the https://www.ibm.com/support/home/ database for a solution.
2	The installation did not find the IBM Workload Scheduler user or its home directory. The IBM Workload Scheduler user that you specified either does not exist or does not have an associated home directory.	Verify the operating system definition of the IBM Workload Scheduler user.
3	Not applicable	

Error Code	Description	User action
4	The IBM Workload Scheduler installation directory is not empty. You specified as installation folder a directory that exists.	Empty it or specify a different directory.
5	An error occurred checking the IBM Workload Scheduler prerequisites on the workstation.	See the System Requirements Document at IBM Workload Scheduler Detailed System Requirements .
6	The IBM Workload Scheduler registry is corrupted.	Use the <code>recovInstReg</code> option to recover the registry. Then, rerun the operation.
7	The upgrade or restore operation cannot retrieve the information from the configuration files.	Check that the previous installation and the <code>localopts</code> , the <code>globalopts</code> , the <code>ita.ini</code> , and the <code>JobManager.ini</code> files are not corrupted. Correct the errors and try again the operation.
8	The upgrade, restore, or uninstallation cannot proceed because there are jobs that are running.	Stop the jobs that are running or wait for these jobs to complete. Restart the operation.
9	The upgrade, restore, or uninstallation cannot proceed because there are files that are locked.	Stop all the processes that are running and close all the activities that can block the installation path. Restart the operation.
10	The upgrade, restore, or uninstallation cannot proceed because there are command lines opened.	Close the command lines. Restart the operation.

Chapter 4. Deploying with containers

Deploy IBM Workload Automation quickly and easily with containers.

Following you can find more details about the IBM Workload Automation deployment with containers based on your environment.

Docker containers

An easy and fast deployment method of IBM Workload Automation. Docker compose is a method to instantly download the product image, create a container, and start up the product.

Docker is a state-of-the-art technology which creates, deploys, and runs applications by using containers. Packages are provided containing an application with all of the components it requires, such as libraries, specific configurations, and other dependencies, and deploy it in no time on any other Linux or Windows workstation, regardless of any different settings between the source and the target workstation.

Docker adoption ensures standardization of your workload scheduling environment and provides an easy method to replicate environments quickly in development, build, test, and production environments, speeding up the time it takes to get from build to production significantly. Install your environment using Docker to improve scalability, portability, and efficiency.

Docker containers are available for UNIX, Windows and Linux on Z operating systems.

For more information, see the introductory readme file for all components available at [IBM Workload Automation](#). You can also find detailed information for each component in the related readme file, as follows:

- [IBM Workload Automation Console](#)
- [IBM Workload Automation dynamic agent](#)
- [IBM Workload Automation z-centric agent](#)

Amazon Web Services (AWS) Elastic Kubernetes Service (EKS) (Amazon EKS)

You can use Amazon EKS to run IBM® Workload Scheduler containerized product components on the Amazon Web Services secure cloud platform.

For more information see [Deploying on Amazon EKS on page 159](#).

Azure Kubernetes Service (AKS)

Deploy and manage IBM® Workload Scheduler containerized product components on the Azure AKS, a container orchestration service available on the Microsoft Azure public cloud. You can use Azure AKS to deploy, scale up, scale down and manage containers in the cluster environment. You can also deploy and run an Azure SQL database.

For more information see [Deploying on Azure AKS on page 159](#).

Google GKE

Google Kubernetes Engine (GKE) provides a managed environment for deploying, managing, and scaling your containerized applications using Google infrastructure. The Google GKE environment consists of multiple machines grouped together to form a cluster. You can also deploy and run Google Cloud SQL for SQL server.

Google GKE supports session affinity in a load balancing cluster, a feature which maintains each user session always active on the same pod. This ensures that the Dynamic Workload Console always connects to the same server during a session and that the user can perform any number of operations smoothly and seamlessly.

For more information, see [Deploying on Google GKE on page 160](#).

Red Hat OpenShift

Red Hat OpenShift, V4.x

You can deploy IBM Workload Automation components using IBM® certified containers. Deploy the IBM® Workload Automation Operator on your Red Hat OpenShift cluster first, and then use the operator to install the IBM Workload Automation components: the IBM Workload Automation server (master domain manager), Dynamic Workload Console, and the dynamic agent. IBM® certified containers are provided for the operator and for each of the product components. For more information, see [Deploying IBM Workload Automation components on Red Hat OpenShift, V4.x on page 158](#).

Red Hat OpenShift, V3.x

A container is provided for the IBM Workload Automation agent. For more information, see [Deploying IBM Workload Automation agent on Red Hat OpenShift, V3.x on page 158](#).

IBM® Cloud Private

IBM® Cloud Private provides an integrated environment for managing containers that includes the container orchestrator Kubernetes, a private image repository, a management console, and monitoring frameworks. With IBM® Cloud Private, you can deploy the IBM Workload Automation components as Helm charts to quickly configure and run them as Docker container applications in a Kubernetes cluster. You can then manage the IBM Workload Automation components from the IBM® Cloud Private dashboard or from the command-line interface.

The IBM Workload Automation Server, IBM Workload Automation Console, and IBM Workload Automation Agent components can be deployed into IBM® Cloud Private, an application platform for developing and managing on-premises, containerized applications.

For more information, see [Deploying IBM Workload Automation in IBM Cloud Private on page 160](#).

Considerations about deploying with containers

Some considerations about your IBM Workload Automation environments when the product components are deployed using containers.

An environment deployed with containers has some characteristics that differ from an environment installed using the classic installation method. Following is a list of its characteristics:

- Container deployment is supported only for dynamic agents and not for fault-tolerant agents, and external fault-tolerant agents are not supported on Kubernetes.
- All dynamic agents must obligatorily be configured to use a dynamic agent gateway.
- Each time a `switcheventprocessor` command is issued, a `switchmgr` command must also be issued on the same node.
- An on-premises fault-tolerant agent cannot connect to a master domain manager for on-cloud solutions supported by IBM Workload Scheduler (only dynamic agents are supported).
- The IBM Workload Scheduler event processor service must run on the same machine where the current master is running because the host and port are re-mapped by dynamic agents to use the master server host and port. Thus, performing a switch from master to backup master, you must also switch the event processor on the new master.
- The console, server and agent components are installed with non-root user (`wauser`) that does not include sudoers privileges. This implies that jobs that run on agents on containers can run only with `wauser` user and cannot impersonate other users.
- An extended agent component, (`RELEASE_NAME-waserver-0_XA`), is automatically created on the server. It starts the scheduling process by running the FINAL job stream that generates the daily production plan.
- When stopping the console, server and agents on IBM® Cloud Private, the ICP liveness probe automatically restarts them. To avoid the restart, see the [Container maintenance procedure on page 165](#).
- An FTA container is not provided (only dynamic agents are supported in containers).
- By default, the FINAL job stream has a start time of 07:00 and invokes MAKEPLAN at 07:00. The Start of Day is 00:00. MAKEPLAN extends the plan until 09:00 the following day. If you modify the scheduling time of the FINAL job stream to a time different from the default, then evaluate whether you should also manually modify the plan extension time defined in the MAKEPLAN job accordingly.

The following is an example of the default output when you run `planman showinfo`:

```
Locale LANG set to the following: "en"
Plan creation start time: 06/23/2020 00:00 TZ UTC
Production plan start time of last extension: 06/24/2020 09:00 TZ UTC
Production plan end time: 06/25/2020 08:59 TZ UTC
Production plan time extension: 024:00
Plan last update: 06/24/2020 07:00 TZ UTC
Preproduction plan end time: 07/08/2020 00:00 TZ UTC
Start time of first not complete preproduction plan job stream instance: 06/23/2020 00:00 TZ UTC
```

Deploying with Docker compose

Getting started with Docker compose

This topic gives you an overview of the high-level procedure to deploy IBM Workload Automation components using Docker.

To deploy IBM Workload Automation using a Docker container, proceed as follows:

1. Ensure that all of the prerequisites are met as documented in [Prerequisites on page 152](#). If you are deploying on Linux on Z, ensure you perform the preparatory steps documented in [Deploying Docker compose on Linux on Z on page 152](#).
2. Access and then download the Docker image from the entitled registry. For further information, see the complete procedure in [Deploying containers with Docker on page 154](#).
3. You can choose to deploy all product containers with a single command, or you can deploy each product component container individually.

For more information, see the introductory readme file for all components available at [IBM Workload Automation](#). You can also find detailed information for each component in the related readme file, as follows:

- [IBM Workload Automation Console](#)
- [IBM Workload Automation dynamic agent](#)
- [IBM Workload Automation z-centric agent](#)

4. Access the container to verify the status and run IBM Workload Automation commands. For further details see [Accessing the Docker containers on page 155](#).

Prerequisites

Prerequisite information when deploying with containers.

When deploying the product using containers, ensure you have fulfilled the following prerequisites:

Check the [Prerequisites on page 47](#) of the command line installation method.

If you want to calculate the necessary resources that the agent container needs to run, use the following formula:

Evaluate the volume_size variable:

```
Volume size(MB)=  
120 + [ 30 x jobs_per_day x (average_joblog_size_MB / 3 + 0.008) ]
```

For example, considering "average_joblog_size_MB = 0.001 MB (1KB)", you obtain:

```
1.000  
jobs_per_day: 370 MB --> volume_size = 370Mi
```

```
10.000  
jobs_per_day: 2.6 GB --> volume_size = 2600Mi
```

```
100.000  
jobs_per_day: 25 GB --> volume_size = 25Gi
```

Deploying Docker compose on Linux on Z

Before you deploy IBM Workload Automation components on Linux on Z, ensure that you have deployed Docker compose, as explained in the following procedure.

To deploy the containers, docker-compose is required on the local workstation. Perform the following steps:

1. Browse to `/usr/local/bin` and create a file with name `docker-compose` with the following contents:

```
#
# This script will attempt to mirror the host paths by using volumes for the
# following paths:
# * $(pwd)
# * $(dirname $COMPOSE_FILE) if it's set
# * $HOME if it's set
#
# You can add additional volumes (or any docker run options) using
# the $COMPOSE_OPTIONS environment variable.
#

set -e

VERSION="1.27.4"
IMAGE="ibmcom/dockercompose-s390x:$VERSION"

# Setup options for connecting to docker host
if [ -z "$DOCKER_HOST" ]; then
    DOCKER_HOST='unix:///var/run/docker.sock'
fi
if [ -S "${DOCKER_HOST#unix://}" ]; then
    DOCKER_ADDR="-v ${DOCKER_HOST#unix://}:${DOCKER_HOST#unix://} -e DOCKER_HOST"
else
    DOCKER_ADDR="-e DOCKER_HOST -e DOCKER_TLS_VERIFY -e DOCKER_CERT_PATH"
fi

# Setup volume mounts for compose config and context
if [ "$(pwd)" != '/' ]; then
    VOLUMES="-v $(pwd):$(pwd)"
fi
if [ -n "$COMPOSE_FILE" ]; then
    COMPOSE_OPTIONS="$COMPOSE_OPTIONS -e COMPOSE_FILE=$COMPOSE_FILE"
    compose_dir="$(dirname "$COMPOSE_FILE")"
    # canonicalize dir, do not use realpath or readlink -f
    # since they are not available in some systems (e.g. macOS).
    compose_dir="$(cd "$compose_dir" && pwd)"
fi
if [ -n "$COMPOSE_PROJECT_NAME" ]; then
    COMPOSE_OPTIONS="-e COMPOSE_PROJECT_NAME $COMPOSE_OPTIONS"
fi
if [ -n "$compose_dir" ]; then
    VOLUMES="$VOLUMES -v $compose_dir:$compose_dir"
fi
if [ -n "$HOME" ]; then
    VOLUMES="$VOLUMES -v $HOME:$HOME -e HOME" # Pass in HOME to share docker.config and allow
    ~/-relative paths to work.
fi
i=$#
while [ $i -gt 0 ]; do
    arg=$1
    i=$((i - 1))
    shift
done
```

```

case "$arg" in
  -f|--file)
    value=$1
    i=$((i - 1))
    shift
    set -- "$@" "$arg" "$value"

    file_dir=$(realpath "$(dirname "$value")")
    VOLUMES="$VOLUMES -v $file_dir:$file_dir"
    ;;
  *) set -- "$@" "$arg" ;;
esac
done

# Setup environment variables for compose config and context
ENV_OPTIONS=$(printenv | sed -E "/^PATH=.*;/d; s/^/-e /g; s/=.*/;/g; s/\n/ /g")

# Only allocate tty if we detect one
if [ -t 0 ] && [ -t 1 ]; then
  DOCKER_RUN_OPTIONS="$DOCKER_RUN_OPTIONS -t"
fi

# Always set -i to support piped and terminal input in run/exec
DOCKER_RUN_OPTIONS="$DOCKER_RUN_OPTIONS -i"

# Handle usersns security
if docker info --format '{{json .SecurityOptions}}' 2>/dev/null | grep -q 'name=usersns'; then
  DOCKER_RUN_OPTIONS="$DOCKER_RUN_OPTIONS --usersns=host"
fi

# shellcheck disable=SC2086
exec docker run --rm $DOCKER_RUN_OPTIONS $DOCKER_ADDR $COMPOSE_OPTIONS $ENV_OPTIONS $VOLUMES -w "$(pwd)"
  $IMAGE "$@"

```

2. Run the following command to make the `docker-compose` file an executable file:

```
sudo chmod +x /usr/local/bin/docker-compose
```

3. More detailed technical information for each component are available in the sample readme files:

- [IBM Workload Automation Console](#)
- [IBM Workload Automation dynamic agent](#)
- [IBM Workload Automation z-centric agent](#)

Deploying containers with Docker

How to deploy the current version of IBM Workload Automation using Docker containers.

About this task

This chapter describes how to deploy the current version of IBM Workload Automation using Docker containers.

The available Docker containers are:

- IBM Workload Automation Server, containing the master domain manager and backup master domain manager images for UNIX, Windows, and Linux on Z operating systems.
- IBM Workload Automation Console, containing the Dynamic Workload Console image for UNIX, Windows, Linux on Z operating systems, and the IBM z/OS Container Extensions (zCX) feature.
- IBM Workload Automation dynamic agent and the image of the agent with the machine learning engine, containing the Agent image for UNIX, Windows, Linux on Z operating systems. and the IBM z/OS Container Extensions (zCX) feature.
- IBM Workload Automation z-centric agent, containing the Agent image for UNIX, Windows, Linux on Z operating systems. and the IBM z/OS Container Extensions (zCX) feature.

Each container package includes also a `docker-compose.yml` file to configure your installation.

The dynamic agent component (also the one included in the IBM Workload Automation Server container) is deployed and configured with a gateway.

You can choose to deploy all product containers with a single command, or you can deploy each product component container individually.

Deploying all product component containers with a single command

The following readme file contains all the steps required to deploy all product components at the same time:

[IBM Workload Automation](#)

Deploying each product component container individually

If you want to install server, console and agent containers individually, see the related readme files :

- [IBM Workload Automation Console](#)
- [IBM Workload Automation dynamic agent](#)
- [IBM Workload Automation z-centric agent](#)



Note: The database is always external to the Docker engine and is not available as a container



Note: When deploying the server (master domain manager) container, the database schema is automatically created at the container start. If you are planning to install both the IBM Workload Automation server master domain manager and backup master domain manager, ensure that you run the command for one component at a time. To avoid database conflicts, start the second component only when the first component has completed successfully.

Accessing the Docker containers

This topic shows you how to access the container shell and run IBM Workload Automation commands.

To check the container status and run IBM Workload Automation commands, you need to access the containers as described below:

1. Obtain the container ID by running the following command: `docker ps`

An output similar to the following one is returned:

CONTAINER ID	IMAGE	NAMES
b02459af2b9c	wa-console

2. Access the Docker container by running the following command: `docker exec -it <container_id> /bin/bash`

Where

container_id

Is the ID of the container obtained with the command explained in the first step, for example **b02459af2b9c**.

Connecting an on-prem fault tolerant agent to an IBM Workload Automation Server container

To establish a communication between an on-prem fault tolerant agent and an IBM Workload Automation server container, configure the server *docker-compose.yml* file as follows:

1. Open all external ports as shown in the example below:

```
ports (port mapping "external:internal"):
  - 31116:31116 #HTTPS server port
  - 31111:31111 #HTTP netman port
  - 33113:33113 #HTTPS netman ssl port
  - 31131:31131 #HTTP EIF port
  - 35131:35131 #HTTPS EIF ssl port
```

2. Add the **extra_hosts** parameter under **hostname**, and insert all remote machine hostnames that docker must contact (including the one of the on-prem FTA).

```
hostname: wa-server
extra_hosts:
  - hostname1: IP_Address
  - hostname2: IP_Address
  - hostname3: IP_Address
  ...
```

Furthermore, in the `/etc/hosts` file on the remote machine where the on-prem FTA is running, add the hostname of the IBM Workload Automation server container.

```
IP_Address    hostname
```



Note: You can find the hostname of the IBM Workload Automation server container in the server *docker-compose.yml* file.

Creating a Docker image to run dynamic agents

Quickly create a Docker image to run dynamic agents.

You can run dynamic agents in a Docker container that you use to run jobs remotely, for example to call REST APIs or database stored procedures, or to run jobs within the container itself.

To create a Docker container, you are provided with step-by-step instructions and the latest versions of the required samples on GitHub [here](#). Follow the instructions to create a Docker container to run jobs remotely, or use it as base image to add the applications to be run with the agent to other images, or customize the samples to best meet your requirements.

Deploying IBM Workload Automation components on Red Hat OpenShift

You can now deploy IBM Workload Automation components on Red Hat OpenShift.

IBM Workload Automation supports Red Hat OpenShift, 4.x for all IBM Workload Automation product components, and V3.x for the agent component only.

For Red Hat OpenShift, V4.x, two separate containers are provided. One contains the IBM Workload Automation agent only, and the second, the IBM Workload Automation master domain manager, Dynamic Workload Console, and agent in a single container. For more information, see [Deploying IBM Workload Automation components on Red Hat OpenShift, V4.x on page 158](#).

Red Hat OpenShift, V4.x

You can deploy IBM Workload Automation components using IBM® certified containers. Deploy the IBM® Workload Automation Operator on your Red Hat OpenShift cluster first, and then use the operator to install the IBM Workload Automation components: the IBM Workload Automation server (master domain manager), Dynamic Workload Console, and the dynamic agent. IBM® certified containers are provided for the operator and for each of the product components. For more information, see [Deploying IBM Workload Automation components on Red Hat OpenShift, V4.x on page 158](#).

Red Hat OpenShift, V3.x

A container is provided for the IBM Workload Automation agent. For more information, see [Deploying IBM Workload Automation agent on Red Hat OpenShift, V3.x on page 158](#).

Readme for OpenShift Containers

For technical information about the deployment of IBM Workload Scheduler using OpenShift containers, see the following supported versions:

Red Hat OpenShift, V4.x

You can deploy IBM Workload Automation components with IBM® certified containers. Deploy the IBM Workload Automation Operator on your Red Hat OpenShift cluster first, and then use the operator to install the IBM Workload Automation components: the IBM Workload Automation server (master domain manager), Dynamic Workload Console, and the dynamic agent. IBM® certified containers are provided for the operator and for each of the product components. Readme files:

- [IBM Workload Automation](#)
- [Deploying the IBM Workload Automation Operator](#)
- [Deploying the IBM Workload Automation components](#)

Red Hat OpenShift, V3.x

A container is provided for the IBM Workload Automation agent only. Readme file: [Deploying using OpenShift](#).

Deploying IBM Workload Automation components on Red Hat OpenShift, V4.x

Deploy IBM Workload Automation product component containers on a Red Hat OpenShift, V4.x environment.

The IBM Workload Automation product components can be deployed onto Red Hat OpenShift, V4.x. You can deploy IBM Workload Automation components using IBM® certified containers on a Kubernetes-based container application platform useful to orchestrate containerized applications. Deploy the IBM Workload Automation Operator on your Red Hat OpenShift cluster first, and then use the Operator to install the IBM Workload Automation components: the IBM Workload Automation server (master domain manager), Dynamic Workload Console, and the dynamic agent. IBM® certified containers are provided for the operator and for each of the product components. You can then manage the IBM Workload Automation containers from the OpenShift dashboard or from the command line interface.

For complete instructions, see the following readme files:

- [IBM Workload Automation](#)
- [Deploying the IBM Workload Automation Operator](#)
- [Deploying the IBM Workload Automation components](#)

Deploying IBM Workload Automation agent on Red Hat OpenShift, V3.x

Add and deploy IBM Workload Automation agent container on a Red Hat OpenShift, V3.x environment.

The IBM Workload Automation agent container can be deployed onto OpenShift, V3.x, a Kubernetes-based container application platform useful to orchestrate containerized applications. By using OpenShift, you can deploy the IBM Workload Automation agent container with a *template.yml* file to quickly configure and run it as Docker container application in a Kubernetes cluster. You can then manage the IBM Workload Automation agent container from the OpenShift dashboard or from the command line interface.

For the complete installation, configuration, and upgrade procedure, see the section *Deploying and starting the IBM Workload Automation agent container on OpenShift* in the following readme file: https://github.com/WorkloadAutomation/ibm-workload-automation-docker-compose/blob/master/readmes/readme_DYNAMIC_AGENT.md.

Prerequisites

Prerequisite information when deploying containers on Red Hat OpenShift.

When deploying the product on OpenShift, consider the following prerequisites:

- Check the [Prerequisites on page 47](#) of the command line installation method.
- Run the IBM Workload Automation agent container on x86_64 systems.
- Install Red Hat OpenShift v3.10 or later.

- If dynamic provisioning is not being used, Persistent Volume must be re-created and setup with labels that can be used to refine the Kubernetes PVC bind process.
- If dynamic provisioning is being used, specify a storageClass per Persistent Volume provisioner to support dynamic volume provisioning. The storageClass must be created and configured before the deployment by the OpenShift cluster administrator.

Deploying on Amazon EKS

You can use Amazon Elastic Kubernetes Service (EKS) to run IBM® Workload Scheduler containers on Amazon Web Services (AWS) EKS.

As more and more organizations move their critical workloads to the cloud, there is an increasing demand for solutions and services that help them easily migrate and manage their cloud environment.

To respond to the growing request to make automation opportunities more accessible, IBM® Workload Scheduler is now offered on the Amazon Web Services cloud. Within just a few minutes, you can access the product Helm chart and container images and easily launch an instance to deploy an IBM® Workload Scheduler server, console, and agents with full on-premises capabilities on AWS. IBM® Workload Scheduler on AWS improves flexibility and scalability of your automation environment. It helps in lowering costs and eliminating complexity, while reducing the operational overhead and the burden involved in managing your own infrastructure, so you can invest your time and resources in growing your business. Also, IBM® Workload Scheduler on AWS delivers faster access to managed services solutions, for a full product lifecycle management.

Full details and deployment instructions are available in the [IBM Workload Automation Chart readme file](#).

Deploying on Azure AKS

You can deploy and manage IBM® Workload Scheduler containers on Azure Kubernetes Service (AKS).

Deploy and manage IBM® Workload Scheduler containerized product components on the Azure AKS, a container orchestration service available on the Microsoft Azure public cloud. You can use Azure AKS to deploy, scale up, scale down and manage containers in the cluster environment. You can also deploy and run an Azure SQL database.

As more and more organizations move their critical workloads to the cloud, there is an increasing demand for solutions and services that help them easily migrate and manage their cloud environment.

To respond to the growing request to make automation opportunities more accessible, IBM® Workload Scheduler can now be deployed on Azure AKS. Within just a few minutes, you can easily launch an instance to deploy an IBM® Workload Scheduler server, console, and agents with full on-premises capabilities on the Microsoft Azure public cloud.

IBM® Workload Scheduler deployed in a cluster environment improves flexibility and scalability of your automation environment. It helps in lowering costs and eliminating complexity, while reducing the operational overhead and the burden involved in managing your own infrastructure, so you can invest your time and resources in growing your business.

Running the product containers within Azure AKS gives you access to services such as a highly scalable cloud database service. You can deploy and run any of the following Azure SQL Server database models in the Azure cloud, depending on your needs:

- SQL database
- SQL managed instance
- SQL virtual machine

Full details and deployment instructions are available in the [IBM Workload Automation Chart readme file](#).

Deploying on Google GKE

You can deploy and manage IBM® Workload Scheduler containers on Google GKE.

Google Kubernetes Engine (GKE) provides a managed environment for deploying, managing, and scaling your containerized applications using Google infrastructure. The Google GKE environment consists of multiple machines grouped together to form a cluster. You can also deploy and run Google Cloud SQL for SQL server.

As more and more organizations move their critical workloads to the cloud, there is an increasing demand for solutions and services that help them easily migrate and manage their cloud environment.

To respond to the growing request to make automation opportunities more accessible, IBM® Workload Scheduler can now be deployed on Google GKE. Within just a few minutes, you can easily launch an instance to deploy an IBM® Workload Scheduler server, console, and agents with full on-premises capabilities on the Google GKE public cloud.

IBM® Workload Scheduler deployed in a cluster environment improves flexibility and scalability of your automation environment. It helps in lowering costs and eliminating complexity, while reducing the operational overhead and the burden involved in managing your own infrastructure, so you can invest your time and resources in growing your business.

Running the product containers within Google GKE gives you access to services, such as a cloud database service. Cloud SQL for SQL Server is a managed database service that helps you set up, maintain, manage, and administer your SQL Server databases on Google Cloud Platform

Full details and deployment instructions are available in the [IBM Workload Automation Chart readme file](#).

Deploying IBM Workload Automation in IBM® Cloud Private

Add IBM Workload Automation containers in IBM® Cloud Private, then deploy them in IBM® Cloud Private.

About this task

The IBM Workload Automation Agent, the IBM Workload Automation Server, and the IBM Workload Automation Console containers can be deployed into IBM® Cloud Private, an application platform for developing and managing on-premises, containerized applications.

IBM® Cloud Private provides an integrated environment for managing containers that includes the container orchestrator Kubernetes, a private image repository, a management console, and monitoring frameworks. With IBM® Cloud Private, you

can deploy the IBM Workload Automation containers as Helm charts to quickly configure and run them as Docker container applications in a Kubernetes cluster. You can then manage the IBM Workload Automation containers from the IBM® Cloud Private dashboard or from the command line interface.

The IBM Workload Automation containers are available with the following options:

- IBM Workload Automation Agent - production edition, fee-based
- IBM Workload Automation Server - production edition, fee-based
- IBM Workload Automation Console - production edition, fee-based

IBM Workload Automation containers are based on a *per job license* (for further details, see the *License Management in IBM License Metric Tool* chapter in *IBM Workload Scheduler: Administration Guide*)

Readmes for IBM® Cloud Private with Helm Charts

For technical information about the deployment of IBM Workload Automation containers as Helm Charts, read the following Readmes file:

- [IBM Workload Automation All](#)

Release Notes

Following you can find the Release Notes for IBM Workload Automation containers:

- [IBM Workload Automation All](#)

Prerequisites

Prerequisite information when deploying in IBM® Cloud Private.

When deploying the product in IBM® Cloud Private, ensure you have fulfilled the following prerequisites:

- Read late-breaking information in [Readme for IBM Cloud Private with Helm Charts](#).
- Docker version 18.03.1 or later.
- Kubernetes 1.11.1 with Beta APIs enabled.
- IBM Workload Automation containers run on x86_64 systems.
- If dynamic provisioning is not being used, Persistent Volume must be re-created and setup with labels that can be used to refine the Kubernetes PVC bind process
- If dynamic provisioning is being used, specify a storageClass per Persistent Volume provisioner to support dynamic volume provisioning
- A default storageClass is setup during the cluster installation or created prior to the deployment by the Kubernetes administrator
- Additional pre and post configuration scripts, instructions, files, samples, etc. might be placed in the `ibm_cloud_pak/pak_extensions` folder. The `pak_extension` folder contains two subdirectories that you can use for your extensions. The current structure is:

```

ibm_cloud_pak
  pak_extensions
    post-delete
      clusterAdministration
        deleteRolePSP.sh
      namespaceAdministration
        deleteRoleBinding.sh
    pre-install
      clusterAdministration
        createRolePSP.sh
      namespaceAdministration
        createRoleBinding.sh

```

- Create a Role and a RoleBinding for the namespace (for further details, refer to the Readme specific for the component you're installing)
- Create a DB instance and schema (Server and Console only; for further details, refer to the Readme specific for the component you're installing)
- Create a mysecret.yaml file to store passwords (Server and Console only; for further details, refer to the Readme specific for the component you're installing)

Following you can find a table containing the system requirements for each container:

Table 15. IBM Workload Automation containers' system requirements

System Resource	Agent	Console	Sever
CPU	200m	2	2
Memory	200Mi	8Gi	8Gi
Storage	2Gi	5Gi	10Gi

For additional information about IBM® Cloud Private system requirements, refer to the IBM® Cloud Private official documentation.

Using the NFS server with persistent volumes

This section explains how to configure persistent volumes if you use the NFS server.

To avoid issues during the daily activity, it is highly suggested to configure the persistent volume to use the version 3 of the NFS server, and set the local lock parameter to all.

The following is an example of `.yaml` file that shows how to configure the persistent volume:

```

kind: PersistentVolume
apiVersion: v1
metadata:
  name: release_name-data
  labels:
    volname: volume_name
spec:
  capacity:
    storage: 15Gi

```

```

accessModes:
  - ReadWriteOnce
mountOptions:
  - nfsvers=3
  - local_lock=all
nfs:
  path: nfs_server_path
  server: nfs_server_IPaddress

```

where:

volname is the same name specified in the *Volume label name* field during the deployment procedure.

volume_name is the same value specified in the *Volume label value* field during the deployment procedure.

15Gi is the same value specified in the *PV minimum size* field during the deployment procedure.

Adding an IBM Workload Automation container into IBM® Cloud Private

Prepare your IBM® Cloud Private to deploy an IBM Workload Automation container

About this task

IBM® Cloud Private offers managed container services in the cloud. You can download an IBM Workload Automation image from [IBM Passport Advantage](#) and import it into an IBM® Cloud Private container.

1. Download and unzip the IBM Workload Automation image. For further details about images, see the Download Document at [IBM Workload Scheduler download document](#).

The IBM Workload Automation containers are available with the following options:

Table 16. IBM Workload Automation Containers offering

Container	Component type	Charge	Image name
IBM Workload Automation Agent	Dynamic Agent - production edition	fee-based	workload-automation-agent-dynamic
IBM Workload Automation Server	Master Domain Manager and Backup Master Domain Manager - production edition	fee-based	workload-automation-server
IBM Workload Automation Console	Dynamic Workload Console - production edition	fee-based	workload-automation-console

Licenses for the production options are available on [IBM Passport Advantage](#)

2. Import the downloaded file into IBM® Cloud Private.
See [Installing bundled products](#) in the IBM® Cloud Private product documentation.

What to do next

You are now ready to deploy the IBM Workload Automation image into IBM® Cloud Private.

Deploying an IBM Workload Automation image into IBM® Cloud Private

Deploying an IBM Workload Automation image into IBM® Cloud Private.

Before you begin

This task assumes that you have already added an IBM Workload Automation container image into IBM® Cloud Private.

About this task

You configure and deploy the IBM Workload Automation image for developers into IBM® Cloud Private by installing a Helm chart that is already available in the catalog.

You configure and deploy the IBM Workload Automation image for production into IBM® Cloud Private by installing a Helm chart that is available in the catalog only after you purchase and load it.

You can install the chart from the IBM® Cloud Private dashboard, or you can use the command line interface.

Complete the following steps.

1. Log in to IBM® Cloud Private
2. From the navigation menu, click **Catalog**.
3. Find the *ibm-workload-automation-prod* chart. For the components available inside the chart, see [Table 19: Components inside the Helm chart on page 164](#) table.

Table 17. Components inside the Helm chart

Container	Component type	Image name	Installation Helm chart
IBM Workload Automation Agent	Dynamic Agent - production edition	workload-automation-agent-dynamic	ibm-wa-dyn-agent-prod
IBM Workload Automation Server	Master Domain Manager and Backup Master Domain Manager - production edition	workload-automation-server	ibm-wa-server-prod
IBM Workload Automation Console	Dynamic Workload Console - production edition	workload-automation-console	ibm-wa-console-prod

4. Click the applicable chart. The **readme** file is displayed (see [Readme for IBM Cloud Private with Helm Charts](#) for sample readme files).
5. Click **Configure**.
 - To install from the command line, follow the steps in the **readme** file associated with the chart. For more information on using **Helm** commands, see [IBM Cloud Private documentation](#).
 - To install from the dashboard, proceed to the next step.

6. In the Configuration section, choose the component to be deployed and configure the needed parameters. The required settings are: the **Helm Release name** field, the **Target name space** field and the license agreement.
7. Click **Install** to deploy the chart and create a release.

Results

Your IBM Workload Automation component release is deployed into the Kubernetes cluster.

What to do next

When installation is complete, click **View Helm Release** to go to a list of Helm releases. Look for your release to verify whether IBM Workload Automation component was successfully deployed.

After deployment, you can start using the IBM Workload Automation component in IBM® Cloud Private.

Customizing container parameters

The document describes how to avoid the overwriting of the customized parameters added in the container configuration files, such as the `datasource.xml` file.

It is possible to customize the container configuration by adding parameters, for example, in the `datasource.xml` file that is located in the following path:

```
/opt/wautils/dropins
```

Restarting a container, the `datasource.xml` file is overwritten and the customized parameters inside it are lost; to avoid that, proceed as follows:

- Create another `.xml` file with a name that is listed in a higher alphabetical order than `datasource.xml`.
- In the new `.xml` file, add the parameters to be customized together with the corresponding section.

In this way - at the restart of the container - the customized parameters are not overwritten.

Troubleshooting

Version 9.5

This guide describes how to resolve problems with IBM Workload Automation containers. It describes the tools available to help you troubleshoot problems and details many known problem scenarios, and their solutions.

Container maintenance procedure

Check how to avoid POD restart during maintenance.

The POD status check of a Kubernetes-based environment is based on Liveness Probe; the latter checks if all processes are active, if one or more processes are not active, the POD is automatically restarted. Therefore, in case of maintenance, manually stopping the IBM Workload Scheduler processes, the Dynamic Workload Console processes, or the dynamic agent processes causes a POD restart.

To avoid a PD restart during maintenance:

- In the selected POD, create the following file: `/opt/wautils/wa_maintenance`
- Stop the processes listed above and perform all the steps needed for the maintenance
- Restart the stopped processes
- Delete the `/opt/wautils/wa_maintenance` file

Container deployment issues

Check the steps to do if you run into deployment issues.

About this task

If a problem occurs during the deployment, check the steps described below to solve it.

Docker compose

1. Check the system requirements [Prerequisite information when deploying with containers on page 152](#)
2. Make sure that all required configuration parameters have been correctly configured (e.g. license, WA_PASSWORD, DB parameters, etc.).
3. Make sure that the external port mapping does not collide with ports already used by other processes.
4. Activate the debug mode by performing the following steps:
 - Remove all containers by launching the "docker rm -f wa-server wa-console wa-db2" command.
 - Remove the associated volumes by launching the "docker volume prune" command.
 - Edit the docker-compose.yml file by adding "- WA_DEBUG=yes?" under the environment variables (this prevents the containers to exit after the failure).
 - Launch again the services by using "docker-compose up -d".
 - Enter the container name by using "docker exec -it *container_name_or_id* /bin/bash".
 - Check the logs
5. If you find an error in the logs, check the detailed logs in `/home/wauser/wadata/installation/logs`

Red Hat OpenShift

1. See the system requirements documented in the readme [IBM Workload Automation](#) for OpenShift V4.x and [Prerequisites information when deploying on OpenShift on page 158](#) for OperShift 3.x.
2. Make sure that all required configuration parameters have been correctly configured in the custom resources (OpenShift 4.x) or in the `template.yml` file (OpenShift 3.x), for example, license, pools, storage class, to name a few.
3. From the OpenShift command line, check the POD logs by launching the "oc logs -f *pod_name*" command. If launched with the -f (--follow) option, it shows useful information about the installation phase. From the OpenShift platform, go to *Stateful Sets* section in *Applications*, double click on PODS and then click on the POD's name to see the related logs.
4. Activate the debug mode to check the container installation and configuration logs by setting true the "WA_DEBUG" parameter in the configuration file.
5. If you find an error in the logs, check the detailed logs in `/home/wauser/wadata/installation/logs`

IBM® Cloud Private

1. See the system requirements [Prerequisites information when deploying in IBM Cloud Private on page 161](#)
2. Make sure that all required configuration parameters have been correctly configured (e.g. license, DB parameters, password secret, etc.).
3. Check the POD logs by launching the "kubectll logs *pod_name*" command. If launched with the -f (--follow) option, it shows useful information about the installation phase (e.g. "kubectll logs -f myrelease-waserver-0").
4. Activate the debug mode to check the container installation and configuration logs by adding the flag to "Container debug for support only troubleshooting" in the "Helm Release" page.
5. If you find an error in the logs, check the detailed logs in `/home/wauser/wadata/installation/logs`

"CURL error 35" error

This document explains how to solve the *CURL error 35* error that might occur on the agent.

If in the *JobManagerGW_message.log* file on the agent you find the following error:

```
|18446744072657463040|152|agent-95-waagent-0.agent-95-waagent-h.cert-manager.svc.cluster.local|
AWSITA320E The gateway was not able to contact the broker server at the address
"https://localhost:35116/JobManagerRESTWeb/JobSchedulerGW/actions/GWID_AGENT_ICP_agent_95_waagent_0"
to obtain the list of actions to execute.
The error is: "AWSITA245E An error occurred getting the response of the HTTP request.
The error is "CURL error 35".
```

And simultaneously in the *message.log* on the server you find the following error:

```
00058543 com.ibm.scheduling.jobdispatcher
W AWKJDE235W A connection problem occurred submitting job ID "25f769bd-d0e3-3a90-ae47-c7f8a51c549c" with name
"AGENT_ICP#EVERY_1800_4.S_PEAK_JOB_65.SCHEDID-0AAAAAAAAAAP35AZ.JNUM-757735705" to the endpoint URL
"https://agent-95-waagent-0:31114/ita/JobManager/job".
The error message is: "AWKJDE519E The agent did not contact the server to manage this request.".
```

Proceed as follows:

1. Edit the *JobManagerGW.ini* file on the agent, by adding **ActionPollers = 3** (if the ActionPollers is not specified, the default value is 1). The file is located in the following path:

```
/home/wauser/wadata/ITA/cpa/config/
```



Note: The **ActionPollers = 3** must be added only in the *[ITA]* section.

The following is an example of the *JobManagerGW.ini* file:

```
[ITA]
name = JobManagerGW
autostart = yes
fname = /opt/wa/TWS/bin/JobManagerGW
keepalive = yes
status_timeout = 300
check_status = yes
commstart = false
display_name = JobManagerGW
```

```
version = 1.0
type = optional
min_up_time = 60
JobManagerGWID = GWID_AGENT_ICP_agent_95_waagent_0
JobManagerGWURIs = https://localhost:31114/ita/JobManagerGW/JobManagerRESTWeb/
                    JobScheduler/resource
ActionPollers = 3
```

2. To avoid a POD restart during maintenance, follow the procedure described in the [Container maintenance procedure on page 165](#)
3. Stop and start the agent by submitting the following command:

```
/opt/wa/TWS/ShutDownLwa
```

```
/opt/wa/TWS/StartUpLwa
```


Chapter 5. Post-installation configuration

The most common configuration steps to be performed after completing the installation.

After successfully installing IBM Workload Scheduler, there are a number of recommended configuration steps to be performed that are described in more detail in this section.

Configuring LDAP

Detailed instructions for configuring Lightweight Directory Access Protocol (LDAP).

About this task

By default, the dynamic domain manager, the Dynamic Workload Console, and the master domain manager are configured to use a local file-based user repository. For more information about supported authentication mechanisms, see the topic about available configurations in the *Administration Guide*.

You can implement a basic user registry or an LDAP-based user repository by configuring the sample authentication templates provided in XML format. The following are the supported authentication methods and the corresponding sample template that can be configured to replace the configuration file currently in use:

- File-based: `auth_basicRegistry_config.xml`
- IBM® Directory Server: `auth_IDS_config.xml`
- OpenLDAP: `auth_OpenLDAP_config.xml`
- Windows Server Active Directory: `auth_AD_config.xml`

You can further customize the templates by adding additional elements to the XML files. For a full list of the elements that you can configure to complement or modify the configuration, see the related WebSphere Application Server Liberty Base documentation, for example [LDAP User Registry \(ldapRegistry\)](#).

To configure an LDAP user registry, see [Configuring an LDAP user registry on page 169](#).

To configure a basic user registry, see [Configuring a basic user registry on page 171](#).

Configuring an LDAP user registry

About this task

To configure a common LDAP for both the IBM® Workload Scheduler and the Dynamic Workload Console, complete the following steps:

1. Assign a role to your LDAP group.
 - a. Log in to the Dynamic Workload Console as administrator and access the **Manage Roles** page.
 - b. Add a new **Entity** of type **Group** to the role you want to assign to your LDAP group and click **Save**.
2. Update the authentication configuration template file with the details about your LDAP server.

- a. Copy the template file to a working directory. The templates are located in the following path:

Dynamic Workload Console

```
DWC_DATA_dir/usr/servers/dwcServer/configDropins/templates/authentication
```

master domain manager

```
TWA_DATA_DIR/usr/servers/engineServer/configDropins/templates/authentication
```

Dynamic Workload Console

```
DWC_home\usr\servers\dwcServer\configDropins\templates\authentication
```

master domain manager

```
TWA_home\usr\servers\engineServer\configDropins\templates\authentication
```

- b. Edit the template file in the working directory with the desired configuration.
- c. Optionally, create a backup copy of the configuration file in a different directory, if the file is already present. To avoid conflicts, ensure the backup copy is in a directory different from the following directories: `configDropins/templates` and `configDropins/overrides`.
- d. Copy the updated template file to the `overrides` directory.
- e. The `overrides` directory is located in the following path:

Dynamic Workload Console

```
DWC_DATA_dir/usr/servers/dwcServer/configDropins/overrides
```

master domain manager

```
TWA_DATA_DIR/usr/servers/engineServer/configDropins/overrides
```

Dynamic Workload Console

```
DWC_home\usr\servers\dwcServer\configDropins\overrides
```

master domain manager

```
TWA_home\usr\servers\engineServer\configDropins\overrides
```

- f. Stop and restart WebSphere Application Server Liberty Base using the `stopappserver` and `startappserver` commands located in `TWA_home/appservertools`.

For more information about configuring an LDAP registry, see the WebSphere Application Server Liberty Base documentation, for example: [Configuring LDAP user registries in Liberty](#) and [Federation of user registries](#).

Configuring a basic user registry

About this task

You can use a basic user registry by defining the users and groups information for authentication on WebSphere Application Server Liberty Base.

To configure basic user registry, complete the following steps:

1. Copy the `auth_basicRegistry_config.xml` template from the `templates` folder to a working folder.
2. Edit the template file in the working folder with the desired configuration by adding users and groups as necessary.

To add a user, add an entry similar to the following in the **basicRegistry** section:

```
<user name="nonadminuser" password="{xor}Ozo5PiozKw==" />
```

To add a group, add an entry similar to the following in the **basicRegistry** section:

```
<group name="TWSUsers">
  <member name="nonadminuser"/>
</group>
```

3. Store the password in xor format using the WebSphere Application Server Liberty Base `securityUtility` command, as described in [securityUtility command](#).

This utility requires the `JAVA_HOME` environment variable to be set. If you do not have Java installed, you can optionally use the Java version provided with the product and available in:

IBM® Workload Scheduler

```
<INST_DIR>/TWS/JavaExt/jre/jre
```

Dynamic Workload Console

```
<DWC_INST_DIR>/java/jre/bin
```

4. Create a backup copy of the configuration file in the `overrides` folder, if already present.
5. Copy the updated template file to the `overrides` folder. Maintaining the original folder structure is not required.

WebSphere Application Server Liberty Base configuration

Describes how WebSphere Application Server Liberty Base configuration files are organized in IBM Workload Scheduler

To simplify administration, configuration, and backup and recovery on UNIX systems, a new default behavior has been implemented with regard to the storage of product data and data generated by IBM Workload Scheduler, such as logs and configuration information. These files are now stored by default in the `TWA_DATA_DIR` directory, which you can optionally customize at installation time.

With a similar approach, also the configuration files for WebSphere Application Server Liberty Base on UNIX systems are stored in the `TWA_DATA_DIR` directory, while binary files are stored in `TWA_home`.

On Windows systems, there is no such separation and the path to WebSphere Application Server Liberty Base configuration files is as follows:

On master domain managers

<TWA_home>\usr\servers\engineServer\configDropins\overrides

On Dynamic Workload Console

<DWC_home>\usr\servers\dwcServer\configDropins\overrides

Also, configuration settings, usually stored in the `server.xml` file, are now divided into several `.xml` files.

To modify WebSphere Application Server Liberty Base configuration settings, first find out the `.xml` file to be modified and the directory where it is stored.

[Table 20: WebSphere Application Server Liberty Base configuration files on page 172](#) lists the files available for WebSphere Application Server Liberty Base configuration.

Table 18. WebSphere Application Server Liberty Base configuration files

Configuration file	Functionality
<i>TWA_DATA_DIR</i> /usr/servers/engineServer/configDropins/overrides	
authentication_config.xml	Authentication settings
datasource.xml	Datasource settings
host_variables.xml	Hostname and port settings
jvm.options	Settings for Java Virtual machine, such as HeapSize
ports_variables.xml	Hostname and port settings
ssl_variables.xml	SSL connections and certificates
wauser_variables.xml	Authentication settings
<i>TWA_DATA_DIR</i> /usr/servers/engineServer/resources/security	
TWSServerKeyFile.jks	WebSphere Application Server Liberty Base key store file, containing security keys
TWSServerTrustFile.jks	WebSphere Application Server Liberty Base trust store file, containing certificates
ltpa.keys	LTPA keys, to be configured for Single Sign On

Configuring Single Sign-On

Detailed instructions for Single Sign-On configuration

About this task

Single Sign-On (SSO) is a method of access control that allows a user to authenticate once and gain access to the resources of multiple applications sharing the same user registry.

For complete instructions about configuring the Dynamic Workload Console and the master domain manager in single sign-on, see the section about configuring the Dynamic Workload Console in single sign-on in the *IBM Workload Scheduler: Administration Guide*.

Connection security overview

IBM Workload Scheduler provides a secure, authenticated, and encrypted connection mechanism for communication based on the Secure Sockets Layer (SSL) protocol, which is automatically installed with IBM Workload Scheduler.

IBM Workload Scheduler also provides default certificates to manage the SSL protocol that is based on a private and public key methodology.

If you do not customize SSL communication with your certificates, to communicate in SSL mode, IBM Workload Scheduler uses the default certificates that are stored in the default directories, as explained in SSL connection by using the default certificates. However, in a production environment, it is recommended that you customize SSL communication with your own certificates.

Starting from Version 9.5, Fix Pack 3, you can optionally generate your SSL certificates automatically when you perform a fresh installation from the CLI using either `.jks` or `.PEM` certificates, as described in the sections about Installing the master domain manager and backup master domain manager, Installing the Dynamic Workload Console servers, and Installing agents.

When you perform a fresh installation, you only need to provide either `.jks` or `.PEM` certificates, specify the directory where the files are located and the password you want to use for the keystore and truststore.

Starting from Version 9.5, Fix Pack 4, you can optionally download certificates in `.PEM` format from the master domain manager to your agent.

When installing the agent with a fresh installation, you only need to provide the credentials to connect to the master domain manager using the **`wouser`** and **`wapassword`** parameters. The certificates in `.PEM` format are automatically downloaded and deployed to the agent without further intervention.

If you have previously installed the agent, you can run the `AgentCertificateDownloader` script on the agent. The script connects to the master domain manager, downloads the certificates in `.PEM` format, and deploys them to the agent. The certificates must be available on the master domain manager in a specific path. For more information, see the section about the `AgentCertificateDownloader` script in *IBM Workload Scheduler: Planning and Installation*.

The installation program automatically generates the certificates. However, SSL communication between fault-tolerant agents is not enabled by default at installation time, and must be manually configured afterwards. For more information on how to configure SSL for fault-tolerant agents, see Scenario: SSL Communication across the fault-tolerant agent network.

Consider that using `.jks` and `.kdb` files is supported but not recommended because it involves several manual steps, which might lead to errors, while the automatic procedure with `.PEM` files is the recommended method.



Note: Only for version 9.5 Fix Pack 4, if you install your agents so that they communicate with the master through a remote gateway, ensure that they can reach the master directly at installation time. For more information, see the section about dynamic agent gateway installation examples in *IBM Workload Scheduler: Planning and Installation*.

If you are upgrading from a previous version or did not use the SSL parameters when performing a fresh installation of Version 9.5, Fix Pack 3 or later, you can customize SSL communication with your own certificates as explained in the following scenarios:

- Customizing certificates for master domain manager and dynamic agent communication
- See the scenario about connection between the Dynamic Workload Console and the IBM Workload Scheduler components in *Planning and Installation Guide*.
- Customizing certificates for master domain manager and Dynamic Workload Console communication
- Extending communication scenarios to other server components
- Scenario: SSL Communication across the fault-tolerant agent network
- Command Reference

Using SSL for event-driven workload automation (EDWA) behind firewalls

This feature allows a domain manager to be run as a reverse proxy for HyperText Transfer Protocol (HTTP) and Event Integration Facility (EIF) protocols, forwarding traffic to the Event Processor. An option, enabled using the **optman** command-line program, allows you to choose if workstations that are behind a firewall must connect to the domain manager instead of to the event processor, causing the new proxy on the domain manager to forward its traffic to the event processor.



Restriction: This configuration is not supported if the agent workstation is a dynamic agent.

The incoming traffic is rerouted as follows:

- If an agent is behind a firewall, the traffic is routed to the domain manager on the agent. If an agent is not behind a firewall, the traffic is sent directly to the event processor.
- If domain managers have child nodes behind a firewall, the traffic is rerouted to the event processor.
- Primary domain managers always reroute traffic to the current event processor.
- Lower level domain managers reroute traffic to upper level domain managers if they are behind a firewall, or to the event processor if they are not behind a firewall.

To use this feature, perform the following steps:

1. Enable the feature by setting the **optman** option to `yes`. The default value is `no`:

```
enEventDrivenWorkloadAutomationProxy | pr = {yes|no}
```

2. In the workstation definition in the database for the agent, set the **behindfirewall** attribute to `ON`.
3. Configure OpenSSL or GSKit on the domain manager.

For details about setting the `behindfirewall` attribute, see the section about workstation definition in *User's Guide and Reference*.

Configuring your master domain manager and broker in SSL mode

About this task

If you plan to install your master domain manager, Version 9.5 Fix Pack 5 or later in SSL mode or plan to upgrade to Version 9.5 Fix Pack 5 or later and set up your master domain manager and broker in SSL mode, perform the following steps:

1. Install the master domain manager or upgrade your current master domain manager to the latest version, for example version 9.5.0.5.
2. Replace the values of the following parameters in the `localopts` file with the following values:
 - **nm SSL full port** = `31113`
 - **SSL key** = `TWA_home/TWS/ssl/OpenSSL/TWSClient.key`
 - **SSL certificate** = `TWA_home/TWS/ssl/OpenSSL/TWSClient.cer`
 - **SSL key pwd** = `TWA_home/TWS/ssl/OpenSSL/password.sth`
 - **SSL CA certificate** = `TWA_home/TWS/ssl/OpenSSL/TWSTrustCertificates.cer`
 - **SSL random seed** = `TWA_home/TWS/ssl/OpenSSL/TWS.rnd`
 - **SSL Encryption Cipher** = `TLsv1.2`

For more information about the `localopts` file, see [Setting local options](#)

3. Modify the master domain manager and broker using the `composer mod` command, as follows:

```
CCPUNAME your_master_domain_manager_workstation

DESCRIPTION "MANAGER CPU"

OS UNIX

NODE localhost TCPADDR 31111

SECUREADDR 31113

DOMAIN MASTERDM

FOR MAESTRO

TYPE MANAGER

AUTOLINK ON

BEHINDFIREWALL OFF

SECURITYLEVEL FORCE_ENABLED

FULLSTATUS ON

END
```

```

CPUNAME your_broker_workstation

DESCRIPTION "This workstation was automatically created."

OS OTHER

NODE localhost TCPADDR 41114

SECUREADDR 41114

DOMAIN MASTERDM

FOR MAESTRO

TYPE BROKER

AUTOLINK ON

BEHINDFIREWALL OFF

SECURITYLEVEL FORCE_ENABLED

FULLSTATUS OFF

END

```

4. Modify the **Broker.Workstation.PortSSL** parameter in the `BrokerWorkstation.properties` file from `false` to `true`.

The **Broker.Workstation.PortSSL** parameter specifies the port used by the broker server to listen to the incoming traffic (equivalent to the Netman port) in SSL mode. It is first assigned at installation time. This port number must always be the same for all the broker servers that you define in your IBM® Workload Scheduler network (one with the master domain manager and one with every backup master domain manager you install) to ensure consistency when you switch masters.

5. Stop and start WebSphere Application Server Liberty Base, as described in [Application server - starting and stopping](#).
6. Stop and start all IBM® Workload Scheduler processes.
7. Run

```
Jnextplan -for 0000
```

Configuring FIPS compliance

Configuring FIPS compliance for your network.

About this task

Federal Information Processing Standards (FIPS) are standards and guidelines issued by the National Institute of Standards and Technology (NIST) for federal government computer systems. FIPS are developed when there are compelling federal government requirements for standards, such as for security and interoperability, but acceptable industry standards or solutions do not exist. Government agencies and financial institutions use these standards to ensure that the products conform to specified security requirements.

For the complete procedure to configure FIPS compliance in your network, see the related section in the *Administration Guide*.

FAQ - Security configurations

A list of questions and answers related to security configurations:

When installing the IBM Workload Scheduler, you might have the need to customize some parameters to suit your environment.

Q:How do I set up SSL communication using custom certificates for master domain manager and dynamic agent?

See the detailed explanation in the section about Customizing certificates for master domain managerdynamic agent communication in Administration Guide.

Q:How do I set up SSL communication using custom certificates for master domain manager and Dynamic Workload Console?

See the detailed explanation in Customizing certificates for master domain manager and Dynamic Workload Console communicationthe section about Customizing certificates for master domain managerDynamic Workload Console communication in Administration Guide.

How do I configure master domain manager and dynamic domain manager in SSL mode?

See the detailed explanation in [Configuring your master domain manager and broker in SSL mode on page 175](#).

Part III. Configuring

Configuring IBM Workload Scheduler components after installation.

About this task

You must configure IBM Workload Scheduler components after installation.

Chapter 6. Setting the environment variables

About this task

Before you configure your IBM Workload Scheduler components, you must set the environment variables using the `tws_env` script.

Starting with Version 9.4, the upgrade installation process for agents installs a new version of the `tws_env` script in the directory `<<TWA_HOME>/TWS`, where `<TWA_HOME>` is the IBM Workload Scheduler installation directory. A backup copy of your original version is created in a backup directory. After the upgrade process, merge the content of the new version with the content of the original version to carry your customized content into the new version.

The script is copied into the backup instance in `/<working_dir>/TWA_<user_name_of_installation_user>`

On Windows™ operating systems, run the `tws_env.cmd` shell script to set up both the `PATH` and `TWS_TISDIR` variables. For example, if IBM Workload Scheduler is installed in the `%ProgramFiles%\IBM\TWA\TWS` directory, the `<PATH>` variable is set as follows:

```
c:\Program Files\IBM\TWA\TWS;c:\Program Files\IBM\TWA\TWS\bin
```



Note: If you have more than one version of IBM Workload Scheduler installed on your computer, make sure `<TWS_TISDIR>` points to the latest one. This ensures that the most recent character set conversion tables are used.

On UNIX™ and Linux™ operating systems, source the `./tws_env.sh` shell script to set up the `PATH`, `TWS_TISDIR`, and `UNISONWORK` variables. For example, if IBM Workload Scheduler is installed in the default directory `/opt/IBM/TWA/TWS` directory, `./tws_env.sh` sets the variables as follows:

```
PATH=/opt/IBM/TWA/TWS:/opt/IBM/TWA/TWS/bin:$PATH
export PATH

TWS_TISDIR=/opt//opt/IBM/TWA/TWS
export TWS_TISDIR
```

The `tws_env` script has two versions:

- `tws_env.sh` for Bourne and Korn shell environments
- `tws_env.csh` for C Shell environments

Chapter 7. Configuring a master domain manager

About this task

After you installed a master domain manager, follow the steps in this section to add the *FINAL* and *FINALPOSTREPORTS* job streams to the database.

The *FINAL* job stream is placed in production every day and runs JnextPlan before the start of a new day.

The *FINALPOSTREPORTS* job stream, responsible for printing post production reports, follows the *FINAL* job stream and starts only when the last job listed in the *FINAL* job stream (*SWITCHPLAN*) is completed successfully.

The installation creates the `<TWS_INST_DIR>\TWS\Sfinal` file that contains the *FINAL* and *FINALPOSTREPORTS* job stream definitions.

You can use the `<TWS_INST_DIR>\TWS\Sfinal` or create a customized new file for the *FINAL* job stream. For more information, see the section about customizing the final job stream in *User's Guide and Reference*.

The following steps give an example of how to configure a master domain manager after the installation:

1. Log in as *TWS_user* or as administrator.
2. Set the environment variables. See [Setting the environment variables on page 179](#).
3. Add the *FINAL* and *FINALPOSTREPORTS* job stream definitions to the database by running the following command from the `/opt/IBM/TWA/TWS` directory:

```
composer add Sfinal
```

where *Sfinal* is the name of the file that contains the *FINAL* and *FINALPOSTREPORTS* job stream definitions.

4. Add the *FINAL* and the *FINALPOSTREPORTS* job streams to the plan by running:

```
JnextPlan
```

You can automate this step after installation. See the section about automating production plan processing in *User's Guide and Reference*.

5. When JnextPlan completes, check the status of IBM Workload Scheduler:

```
conman status
```

If IBM Workload Scheduler started correctly, the status that is returned by the command is `Batchman LIVES`.

6. Change the workstation limit value to run jobs. The default job limit after installation is **0**, so no jobs run at any time. Raise the job limit to allow jobs to run, for example, to run 10 jobs at the same time:

```
conman "limit ;10"
```

If no workstation name is specified for the **limit** command, the default value is the current login workstation.



Note: If the priority of jobs is **HI** (100) or **GO** (101), the limit is ignored and the jobs run even if the limit is 0, unless the workstation fence is greater than or equal to the priority.

Additionally, the following configuration procedures might be necessary. For information about these procedures, see the relevant sections in *Administration Guide*:

- Customizing and configuring global, local, and user options.
- Customizing and configuring user authentication to allow users authorization on actions and objects, and to configure LDAP.
- Setting connection security to enable SSL or GSKit for inter-component communications.

Chapter 8. Configuring a master domain manager configured as backup

About this task

After you install a master domain manager configured as backup, perform the following additional configuration steps:

1. Log in as `TWS_user` on your master domain manager.
2. Add the username and password for the master domain manager configured as backup to the `useropts` file. For details, see the *Administration Guide* section about setting user options..
3. Set the environment variables by running `twc_env` as described in [Setting the environment variables on page 179](#).
4. Define the master domain manager configured as backup as a full status autolink fault-tolerant agent in the IBM Workload Scheduler database, using the `composer` command interface or the Dynamic Workload Console. In this example with `composer`, type the following command:

```
composer
new
```

5. Type the workstation definition in the text editor, for example:

```
CPUNAME BDM1
DESCRIPTION "Backup master domain manager"
OS UNIX
NODE lab777
TCPADDR 31111
FOR MAESTRO
TYPE FTA
AUTOLINK ON
BEHINDFIREWALL OFF
FULLSTATUS ON
end
```

For more information about workstation definitions, see the section about workstation definition in *User's Guide and Reference*.

6. Run `JnextPlan -for 0000` to include the master domain manager configured as backup workstation in the plan and to send the Symphony™ file to it.



Note: Ensure that the global option `carryforward` is set to `all`, otherwise only incomplete job streams are carried forward.

7. Change the workstation limit to allow jobs to run on the workstation. For example, set the number of jobs to run concurrently on the workstation to `10`:

```
conman "limit DM1;10"
```



Note: If you are logged into the master domain manager configured as backup, the workstation name (`DM1` in the above example) is not required.

Additionally, the following configuration procedures might be necessary. For information about these procedures, see the relevant sections in *Administration Guide*:

- Customizing and configuring global, local, and user options.
- Customizing and configuring user authentication to allow users authorization on actions and objects, and to configure LDAP.
- Setting connection security to enable SSL or GSKit for inter-component communications.

Chapter 9. Configuring a domain manager

About this task

After you install a domain manager, perform the following configuration steps:

1. Log in as `TWS_user` on your master domain manager.
2. Set the environment variables by running `twc_env` as described in [Setting the environment variables on page 179](#).
3. Define the domain manager as a full status autolink fault-tolerant agent in the IBM Workload Scheduler database, using the `composer` command interface or the Dynamic Workload Console. In this example, using `composer`, type:

```
composer
new
```

4. Type the workstation definition in the text editor, for example:

```
CPUNAME DDM1
DESCRIPTION "domain manager"
OS UNIX
NODE lab0777
TCPADDR 31111
DOMAIN MDM
FOR MAESTRO
TYPE MANAGER
AUTOLINK ON
BEHINDFIREWALL OFF
FULLSTATUS ON
END
```

For more information about workstation definitions, see the section about workstation definition in *User's Guide and Reference*.

5. Run **JnextPlan -for 0000** to include the domain manager workstation in the plan and to send the Symphony file to it.



Note: Ensure that the global option `carryforward` is set to `all`, otherwise only incomplete job streams are carried forward.

6. Change the workstation limit to allow jobs to run on the workstation. For example, set the number of jobs to run concurrently on the workstation to 10:

```
conman "limit;10"
```


Chapter 10. Configuring a backup domain manager

About this task

After you install a backup domain manager, perform the following configuration steps:

1. Log in as `TWS_user` on your master domain manager.
2. Set the environment variables by running `tws_env` as described in [Setting the environment variables on page 179](#).
3. Define the backup domain manager as a full status autolink fault-tolerant agent in the IBM Workload Scheduler database, using the composer command interface or the Dynamic Workload Console. In this example, using composer, type:

```
composer
new
```

4. Type the workstation definition in the text editor, for example:

```
CPUNAME DDM1
DESCRIPTION "backup domain manager"
OS UNIX
NODE lab0777
TCPADDR 31111
DOMAIN MDM
FOR MAESTRO
  TYPE FTA
  AUTOLINK ON
  BEHINDFIREWALL OFF
  FULLSTATUS ON
END
```

For more information about workstation definitions, see the section about workstation definition in *User's Guide and Reference*.

5. Run **JnextPlan -for 0000** to include the backup domain manager workstation in the plan and to send the Symphony file to it.



Note: Ensure that the global option `carryforward` is set to `all`, otherwise only incomplete job streams are carried forward.

6. Change the workstation limit to allow jobs to run on the workstation. For example, set the number of jobs to run concurrently on the workstation to 10:

```
conman "limit;10"
```

Chapter 11. Configuring a dynamic domain manager

About this task

After you install a dynamic domain manager, perform the following configuration steps:

1. Log in as *TWS_user* on your master domain manager.
2. Set the environment variables by running `tws_env` as described in [Setting the environment variables on page 179](#).
3. Run **JnextPlan -for 0000** to include the dynamic domain manager workstation in the plan and to send the Symphony file to it.



Note: Ensure that the global option `carryforward` is set to `all`, otherwise only incomplete job streams are carried forward.

4. Change the workstation limit to allow jobs to run on the workstation. For example, set the number of jobs to run concurrently on the workstation to 10:

```
conman "limit;10"
```

Chapter 12. Configuration steps for a dynamic domain manager configured as backup

About this task

After you install a dynamic domain manager as backup, perform the following configuration steps:

1. Log in as *TWS_user* on your master domain manager
2. Set the environment variables by running *twc_env* as described in dynamic domain manager.
3. Define the dynamic domain manager as backup as a full status autolink fault-tolerant agent in the IBM Workload Scheduler database, using the composer command interface or the Dynamic Workload Console. In this example using composer, type:

```
composer  
new
```

4. Type the workstation definition in the text editor, for example:

```
CPUNAME BDDM1  
DESCRIPTION "backup dynamic domain manager"  
OS UNIX  
NODE lab00777  
TCPADDR 31111  
DOMAIN DYNAMICDM  
FOR MAESTRO  
TYPE FTA  
AUTOLINK ON  
BEHINDFIREWALL OFF  
FULLSTATUS ON  
END
```

For more information about workstation definitions, see the section about workstation definition in *User's Guide and Reference*.

5. Run **JnextPlan -for 0000** to include the dynamic domain manager as backup workstation in the plan and to send the Symphony file to it.



Note: Ensure that the global option *carryforward* is set to all, otherwise only incomplete job streams are carried forward.

6. Change the workstation limit to allow jobs to run on the workstation. For example, set the number of jobs to run concurrently on the workstation to 10:

```
conman "limit;10"
```

Chapter 13. Configuring a dynamic agent

How to configure a dynamic agent.

About this task

The dynamic agent installation process automatically adds the workstation definition to the database and registers the workstation definition to the dynamic workload broker installed on the master domain manager or dynamic domain manager that you chose during the installation process.

Dynamic agents can be organized in pools to help organize your environment based on the availability of workstations and on the requirements of the jobs that need to be run. You can create a pool, adding dynamic agents to a workstation definition of type pool, or, you can automatically register agents to pools through a different process. See the topic about automatically registering agents to a pool in the *Planning and Installation Guide*.

After installing a dynamic agent, depending on the `enAddWorkstation` global option settings in the master domain manager, perform the following steps:

If `enAddWorkstation` is set to `no`:

1. Run JnextPlan with the **-for 0000** option to add the dynamic agent workstation definition to the plan and to send the Symphony file to it. For more information about workstation definitions, see the section about workstation definition in *User's Guide and Reference*.



Note: To carry forward completed and incomplete job stream instances, ensure that the `carryforward` global option is set to `all` or run JnextPlan `-for 0000` with the **-noremove** option.

2. Change the workstation limit to allow jobs to run on the workstation. For example, set the number of jobs that can run concurrently on the workstation to 10:

```
conman "limit DA235007_00;10"
```

If `enAddWorkstation` is set to `yes`:

The workstation definition is automatically added to the plan after it is defined in the database by the installation process. The `workstationLimit` global option specifies the dynamic agent workstation limit value that the dynamic agent workstation assumes after the workstation is added to the plan.

For more information about how to modify the `enAddWorkstation` and `workstationLimit` global option settings, see the section about global options settings in *Administration Guide*.

For more information about troubleshooting, see the section about troubleshooting when automatically adding dynamic agent workstations to the plan in *Troubleshooting Guide*.

You might also need to run the following configuration procedures. For information about these procedures, see *Administration Guide*.

- Customizing and configuring `jobmanager.ini` and user options.
- Customizing and configuring `JobManagerGW.ini` for opening communication between the gateway and the dynamic workload broker.
- Customizing and configuring user authentication to allow user authorization for actions and objects, and to configure LDAP.
- Setting connection security to enable GSKit for inter-component communications.

Automatically register agents to pools

The dynamic agent installation process automatically adds the workstation definition to the database and registers the workstation definition to the dynamic workload broker installed on the master domain manager or the dynamic domain manager that you specify during the installation process.

You can add dynamic agents in pools to help organize your environment based on the availability of workstations and the requirements of the jobs to be run. Normally, when you create a pool, you add the dynamic agents to a workstation definition of type pool.

Starting from IBM Workload Scheduler version 9.4 Fix Pack 4, you can automatically register dynamic agents in pools by editing the `pools.properties` file located in `TWS_home>/ITA/cpa/config`.

Starting from version 9.5, the `pools.properties` file is located in the following paths:

On Windows operating systems

```
<TWS_home>\ITA\cpa\config
```

On UNIX operating systems

```
<TWA_DATA_DIR>/ITA/cpa/config
```

This alternative way of registering dynamic agents to a pool can be useful when you need to quickly add more than one agent to a pool, or when you want to associate multiple pools to a dynamic agent.

The file is composed by a series of lines with a list of pools to which the agent will be automatically registered. To make the changes in this file effective on the agent, you must stop the agent, edit the file, then start the agent. See the section about the `ShutDownLwa` and `StartUpLwa` commands in *User's Guide and Reference*.

For example, if you want to register a dynamic agent with three different pools, then edit the `pools.properties` file as follows:

```
POOL1
POOL2
POOL3
```

By default, master domain manager and backup domain manager dynamic agents register with the pool named `MASTERAGENTS`. In this case, the `pools.properties` file on these agents contains the following default entry:

```
$MASTERAGENTS
```



Note: The default name for this pool workstation, MASTERAGENTS, can be modified using the optman global option `resubmitJobName`. See the detailed description of the global options in the *Administration Guide* for details about this option.

The following options are supported for each entry in the `pool.properties` file:

;skip

Use this option to exclude pools from even being considered. You might want to ignore specific pools for a period of time, but still maintain them in the list so that they can be considered in the future.

;optional

Use this option to specify that a pool is not obligatory, but optional, so that if the agent is unable to register to a pool, for example, a pool no longer exists) then the pool is ignored.

If an agent has obligatory pools in the `pools.properties` file that are not defined in the system, then the agent will not be able to automatically register and go online. To ensure agent connectivity, these options can be used to manage situations where the agent needs to online even if some pools are not defined.

If the agent does not receive any errors, then the agent goes online and is added to all of the pools in the list, except for those with the `;skip` option specified.

If, instead, the agent encounters an error, the agent is able to determine which of the pools in the list has a problem. If the problematic pool is mandatory (without the `;optional` option specified), then the agent goes offline and is not added to any of the pools. If the problematic pool is optional (with the `;optional` option specified), the pool is discarded.

To demonstrate how you can use these options in the `pool.properties` file, consider the following example:

```
$MASTERAGENTS;optional
POOL1
POOL2;skip
POOL3;optional;skip
POOL4;optional
```

Case 1: POOL1 and POOL4 exist, MASTERAGENTS does not exist

- POOL2;skip is not considered at all.
- POOL3;optional;skip is not considered at all because the `;skip` option overrides the `;optional` option.
- MASTERAGENTS;optional is the problematic pool and is optional and therefore not considered by the agent.
- POOL1 is not a problematic pool.
- POOL4 is not a problematic pool.

Outcome: The agent goes online and is inserted in POOL1 and POOL4.

Case 2: POOL1 does not exist, MASTERAGENTS and POOL4 exist

- POOL2;skip is not considered at all.
- POOL3;optional;skip is not considered at all because the ;skip option overrides the ;optional option.
- MASTERAGENTS;optional is not a problematic pool.
- POOL1 is the problematic pool and is mandatory and cannot be discarded.
- POOL4 is not a problematic pool.

Outcome: The agent goes offline and is not inserted in any of the pools.

Chapter 14. Configuring a remote command-line client

About this task

To configure a remote command-line client that is automatically installed in a fault-tolerant agent instance, perform the following steps:

1. Log on as Administrator on Windows operating systems, or as root on UNIX and Linux operating systems, on the machine where the remote command-line client is installed with a fault-tolerant agent.
2. Open the `localopts` configuration file in the fault-tolerant agent instance.
3. Complete the `# Attributes for CLI connections` configuration section to connect the remote command-line client to the command-line server in the master domain manager:

HOST

The IP address or host name of the workstation where the master domain manager is installed.

PROTOCOL

The protocol that is used by the command-line client to connect to the workstation where the master domain manager is installed. The possible values are `http` and `https`. The default protocol that is used by the command-line client to establish a connection with the master is `https`.

PORT

The HTTP or HTTPS port number that is used to connect to the workstation where the master domain manager is installed. This port number must match the values that are defined for the master domain manager instance.

TIMEOUT

The timeout in seconds to wait for a master domain manager response.

CLISLSSERVERAUTH

Specify whether or not the connection to the master domain manager is SSL or not. If you set this value to `true`, perform the steps described in [Configuring SSL connection between remote command-line client and master domain manager on page 193](#).

CLISLSSERVERCERTIFICATE

Specify only if `CLISLSSERVERAUTH` is set to `true`. The absolute path of the `.arm` file of the server public certificate. For more information about this value, see [Configuring SSL connection between remote command-line client and master domain manager on page 193](#).

CLISLSTRUSTEDDIR

Specify only if `CLISLSSERVERAUTH` is set to `true`. The path of all the `.arm` files that the remote CLI must trust. For more information about this value, see [Configuring SSL connection between remote command-line client and master domain manager on page 193](#).

DEFAULTWS

The master domain manager workstation name.

USEROPTS

The file that contains the user name and password to use to connect to the master domain manager workstation. This user must be a valid user that is listed in the `Security` file on the master domain manager.

4. Save the `localopts`.
5. Restart the fault-tolerant agent processes to accept the `localopts` changes.

Configuring SSL connection between remote command-line client and master domain manager

Before you begin

Before starting with the procedure to configure the SSL connection between the remote command-line client and the master domain manager, ensure that you set the `CLISSELSERVERAUTH` property to `true` in the `localopts` file of the fault-tolerant agent instance.

About this task

To configure a remote command-line client to connect to a master domain manager in SSL mode, perform the following steps:

1. Extract the certificate on the master domain manager instance by running the following procedure:
 - a. Log on as Administrator on Windows operating systems, or as root on UNIX and Linux operating systems, on the machine where the master domain manager is installed.
 - b. Extract the `server.crt` base 64 certificate by running:

```
keytool -export
  -alias server
  -rfc
  -file server.crt
  -keystore <path>/TWSServerKeyFile.jks
  -storepass default
```

where `<path>` is one of the following:

On Windows systems

```
<TWA_home>\usr\servers\engineServer\resources\security
  \TWSServerKeyFile.jks
```

On UNIX systems

```
<TWA_DATA_DIR>/usr/servers/engineServer/resources/security/
  TWSServerKeyFile.jks
```

2. Log on as Administrator on Windows operating systems, or as root on UNIX and Linux operating systems, on the machine where the remote command-line client is installed with a fault-tolerant agent.

3. Perform a binary FTP of the `server.crt` certificate from the machine where you installed the master domain manager instance to the machine where you installed the remote command-line client in the directory `<FTA_INST_DIR>\ssl`.
4. Rename the `<FTA_INST_DIR>\ssl\server.crt` file to `<FTA_INST_DIR>\ssl\server.arm`.
5. Open the `localopts` configuration file in the fault-tolerant agent instance.
6. Complete one of the following attributes in the `# Attributes for CLI connections` configuration section and perform the actions:

CLISLSERVERCERTIFICATE

Specify the absolute path of the `server.arm` file on the fault-tolerant agent machine. In this example, `<FTA_INST_DIR>\ssl\server.arm`.

CLISLTRUSTEDDIR

Specify the path of the directory that contains all the `certificates.arm` files also the `<FTA_INST_DIR>\ssl\server.arm` that the remote command-line client can trust.



Note: Do not set simultaneously the `CLISLSERVERAUTH` and `CLISLTRUSTEDDIR` values. For more information about the SSL configuration, see [Connection security overview on page 173](#) the section about connection security overview in *Administration Guide*.

7. Save the `localopts` file.
8. Restart the fault-tolerant agent processes to accept the `localopts` changes.

Chapter 15. Configuring a z-centric agent on Windows operating systems

About this task

After you install a z-centric agent on a Windows operating system with a local or domain account, perform the following configuration steps:

1. Stop the dynamic agent.
2. From the **Start** menu, click **Administrative Tools > Services**.
3. Edit the properties of the following service by double-clicking on its name: `IBM Common Platform Agent: tws_cpa_agent_TWS_user`, where `TWS_user` is the name of the user for which IBM Workload Scheduler was installed (the name you supplied during installation).
4. Click label **Log On**.
5. Click **Log on as: Local System account**.
6. If you plan to run interactive jobs, check mark **Allow service to interact with desktop**.
7. Click **OK**.
8. From the **Start** menu, click **Administrative Tools > Local Security Policy**.
9. Remove the following permissions from the user created when you installed the z-centric agent:
 - Act as part of the operating system.
 - Log on locally.
 - Log on as batch.
10. Restart the dynamic agent.

Chapter 16. Adding a feature

Use the **twsinst** script to add the following feature to the IBM Workload Scheduler agent in your distributed or end-to-end network:

Add the Java™ run time to an agent

During the installation or the upgrade of the agent you might have chosen not to add the Java™ run time that supports the running of job types advanced options. This option provides your agent with the following capabilities:

- Run job types with advanced options, both those types supplied with the product and the additional types implemented through the custom plug-ins.
- Enable the capability to run remotely, from the agent, the dynamic workload broker resource command on the server.

If you later decide that you require this function, you can add the Java™ run time separately, as described in [Procedure on page 196](#).

If you already installed your environment and you want to enable dynamic scheduling capabilities, see [Enabling dynamic scheduling after installation](#).

Procedure

About this task

To modify agents by using the **twsinst** script, perform the following steps:

On Windows™ operating systems

1. Download the elmage for your operating system. See [Downloading installation images on your workstation on page 201](#).
2. Log in as administrator on the workstation where you want to upgrade the product.
3. From the `root/TWS/operating_system` directory of the elmage, run **twsinst** by using the synopsis described below.



Note: **twsinst** for Windows™ is a Visual Basic Script (VBS) that you can run in CScript and WScript mode, for example:



```
cscript twsinst -modify -uname username
-password user_password -acceptlicense yes
-addjruntime true
```

On UNIX™ and Linux™ operating systems

1. Download the elmage according to the operating system. See [Downloading installation images on your workstation on page 201](#).
2. From the `root/TWS/operating_system` directory, run the **twsinst** script by using the synopsis described below.

A successful modify by using the **twsinst** script issues the return code RC = 0. If the operation fails, to understand the cause of the error, see [Analyzing return codes for agent installation, upgrade, restore, and uninstallation on page 145](#).

Synopsis:

On Windows™ operating systems:

-acceptlicense *yes/no*

Specify whether or not to accept the License Agreement.

-addjruntime *true*

Adds the Java™ run time to run job types with advanced options to the agent. The run time environment is used to run application job plug-ins on the agent and to enable the capability to run remotely, from the agent, the

dynamic workload broker resource command on the server. With the `-modify` option, the only valid value for this parameter is **true**.

This option is applicable to both fault-tolerant agents and dynamic agents.

-inst_dir *install_directory*

The installation directory for IBM Workload Scheduler. The default is the home directory of the user for which IBM Workload Scheduler is being installed.

-modify

Modifies an existing agent that was installed by using **twinst**.

-password *user_password*

Windows™ operating systems only. The password of the user for which you are upgrading IBM Workload Scheduler.

-recovInstReg *boolean*

Select this option to recover workstations that have corrupt registry files without reinstalling the product. If you specify this option, IBM Workload Scheduler re-creates the installation registries. Valid values are **true** and **false**. The default value is **false**.

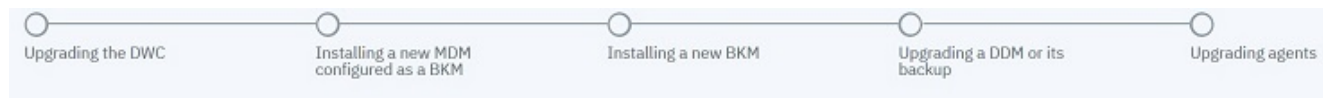
You can use this option also to recover registry files in a cluster environment; in this case you can run the command on any node of the cluster and not necessarily on the node where you installed IBM Workload Scheduler. This is useful when the cluster node where the product is installed is unavailable or in an inconsistent state.

-uname *username*

The name of the user for which IBM Workload Scheduler is being updated. The software is updated in this user's home directory. This user name is not to be confused with the user that performs the upgrade.

Part IV. Upgrading

How to upgrade IBM Workload Scheduler to the current version.



Overview

When upgrading your IBM® Workload Scheduler environment, it is a good practice to start with the upgrade of the Dynamic Workload Console first. If you upgrade the console to the new product version level, you can then use it to verify that your environment is working after upgrading the remaining components.

For information about supported upgrade paths from previous versions see [Dynamic Workload Console Release Notes](#).

The basic upgrade procedure of the remaining components begins with upgrading the master domain manager database tables and then running the `serverinst` script to install a version 9.5 master domain manager configured as a backup. The installation process is able to detect the presence of an existing master domain manager and automatically configures the second one as the backup master domain manager. The new backup master domain manager is configured to point to the existing database instance. You then perform a switch with the previous version master domain manager, so that the newly installed backup master domain manager becomes the current active master domain manager. You then install a second master domain manager to act as the new backup master domain manager. Each master domain manager and backup master domain manager installation requires its own installation of WebSphere Application Server Liberty Base. The upgrade process concludes with upgrading agents. Agents can be upgraded with minimal disruption to scheduling activities.

During the master domain manager upgrade process, the license model to be applied to the environment is defined. The license model determines the criteria by which your license compliance is calculated. The following pricing models are supported: **byWorkstation**, **perServer**, **perJob**. The default value is **perServer**. To determine the current value of this global option, enter the following command: **optman show ln** or **optman show licenseType**. To modify the pricing model, use the **optman chg ln** or **optman chg licenseType** command. For more information about licensing, see the section about license management in IBM License Metric Tool in *Administration Guide*.

To upgrade agents, use the `twsinst` command.

When upgrading, you can upgrade directly to the latest fix pack level, if available, by downloading the latest fix pack image, and launching one single command that automatically installs the latest product level. For more information, see [Upgrading from the CLI on page 202](#).

If you are upgrading from a product version level lower than V9.3 Fix Pack 2, then ensure you do not use `CONDSUCC` when defining new object definitions. This is a reserved keyword and is for internal use only.

Using the new features introduced with the latest release creates new records in the database which are not compatible with previous versions and therefore you cannot roll back your environment to a previous version.

If you upgrade IBM® Workload Scheduler to version 9.5 or later, and the IBM® Workload Scheduler database was created with DB2, change the DB2 configuration parameter EXTENDED_ROW_SZ to ENABLE, or create a new buffer pool and table space with a page size of 16 kilobytes and migrate the tables to the new table space. For more information, see [Error in upgrading the IBM Workload Scheduler database when using a DB2 database on page 324](#).

Before upgrading, ensure that you have stopped workload processing on the master domain manager.

Choosing how to upgrade your network

After upgrading the Dynamic Workload Console, there are different approaches to upgrading the remaining components in your IBM Workload Scheduler environment. Because IBM Workload Scheduler supports compatibility with earlier versions, after upgrading the console, you can decide to proceed with upgrading in one of the following ways, depending on the type of your network:

Top-down

Upgrade the backup master domain manager, then all domain managers, the master domain manager, and then progressively upgrade the agents. This order ensures that events involving folders are correctly managed by the master domain manager and sent to agents at a supported version level.

When you have a backup master domain manager at the V9.5 Fix Pack 2, but the master domain manager is still at a previous product version level, problems can occur when monitoring objects that support the definition in a folder such as, prompts, workstations, and resources, as well as objects that contain the workstation in their object identifier, for example, job streams. More specifically these objects are not displayed in the results of the monitoring query on the plan if you use filters in your query. To solve this problem, upgrade the master domain manager to the V9.5 Fix Pack 2 level and then run planman resynch.

Many of the new functions that are introduced in the current version become available for each agent as it is upgraded. The disadvantage is that the same functions are not available to all agents at the same time.

Bottom-up

Upgrade the agents first, and then upgrade the master domain manager and its backup. The new functions that are introduced in the current version are not available until the whole network is upgraded.



Note: Due to new support of the UPN Windows user, if you have Windows domain users that are defined in the logon fields as `domain\username`, after performing an upgrade to this version, update the `Security` file before starting the IBM Workload Scheduler instance. Insert the escape character `'\'` before the `'\'` character in the `domain\username` value. For example, if you use the `MYDOMAIN\user1` value in the logon field, after the upgrade, in the `Security` file you must update the line in following way:

```
.....
logon=MYDOMAIN\user1
.....
```

For details, see the section about configuring security file in *Administration Guide*.

Chapter 17. Downloading installation images on your workstation

Steps to take when downloading images on your workstation.

About this task

Upgrade from version 9.3.x, 9.4.x to the latest fix pack level

Complete the following procedure to download the installation images to upgrade your environment to the latest fix pack level:

1. Ensure that your workstation has sufficient space to store both the files you download from [IBM Fix Central](#) and the extracted installation image. For more information about system requirements, see [IBM Workload Scheduler Detailed System RequirementsDynamic Workload Console download document](#). To install the fix pack, download all the required images from [IBM Fix Central](#). The zip contains both the General Availability 9.5 image and the latest fix pack image.
2. From [IBM Fix Central](#), download the product images to a temporary directory.
3. Extract the installation image from the downloaded file and verify that the installation image is complete.



Note: WebSphere Application Server Liberty Base V18.0.0.4 is available for download from [IBM Passport Advantage](#) only; however, more updated versions of WebSphere Application Server Liberty Base can be downloaded from [Recommended updates for WebSphere Application Server Liberty](#). For further details about images, see the Download Document at [IBM Workload Scheduler download document](#) and Fix Pack readmes.

Chapter 18. Upgrading from the CLI

Upgrade IBM Workload Scheduler from the command-line interface.

The upgrade procedure varies depending on the product version you currently have installed:

- if you have installed version 9.3.x, 9.4.x and want to upgrade to the latest fix pack level see [Before upgrading on page 202](#).
- If you have installed the General Availability version 9.5 and want to update to the latest fix pack level, see [Installing the fix pack on page 294](#).

Before upgrading

Before starting to upgrade the product, verify that your network has the minimum required supported versions of the operating system, product, and database.

Supported operating systems

To produce a dynamic report that lists the supported operating systems, click [Supported operating systems](#).

For a complete list of system requirements (disk spaces, temporary spaces and RAM usage), see [IBM Workload Scheduler Detailed System Requirements](#).

Supported databases

For an up-to-date list of supported databases, run the [Detailed Software Requirements](#) report and select the Prerequisites tab.

Product level prerequisites for master domain manager and its backup, dynamic domain manager and its backup, and agents

Before you start the upgrade, verify that your environment has the required product level prerequisites. For a complete list of product level prerequisites, see [IBM Workload Scheduler Detailed System Requirements](#).

User authorization requirements

Before starting to upgrade, verify that the user running the installation process has the following authorization requirements:

UNIX™ and Linux™ operating systems

root access

Windows™ operating system

If you set the Windows User Account Control (UAC), your login account must be a member of the Windows™ **Administrators** group or **domain administrators** group with the right **Act as Part of the Operating System**.

You must run the installation as **administrator**.

SSL mode configuration

If the IBM® Workload Scheduler environment is configured in SSL mode, ensure one of the following conditions is met in the `localopts` file before you upgrade master domain manager, backup master domain manager, dynamic domain manager, or fault-tolerant agents to Version 9.5 or later:

- the **SSL Encryption Cipher** parameter is set to TLSv1.2
- If the **SSL Encryption Cipher** parameter is not used, but one of the following parameters is used:
 - **ssl tls12 cipher**
 - **ssl tls11 cipher**
 - **ssl tls10 cipher**

ensure the parameter is set to `HIGH`.

Downloading installation images

Before starting to upgrade, download the installation images. For further information, see [Downloading installation images on your workstation on page 201](#)

Scanning system prerequisites for IBM Workload Scheduler

Before installing or upgrading the product, IBM Workload Scheduler automatically runs a scan on your system.

Before you begin

When installing IBM Workload Scheduler using the `serverinst` script, the script first runs the scanner to verify system prerequisites.



Note: To ensure that the prerequisite scan process does not fail, verify that the `bc` executable is present on the local system and that it is set in the `PATH` environment variable. If you do not want to install the `bc` executable, you can skip the prerequisites check by using the `skipcheckprereq` parameter when running the `serverinst` and `twinsinst` parameters. For more information about the `bc` executable, see [bc, an arbitrary precision calculator language](#). For more information about installation commands, see [Master components installation - serverinst script on page 357](#) and [Agent installation parameters - twinsinst script on page 108](#).

About this task

Having an environment that meets the product system requirements ensures that an installation or upgrade succeeds without any delays or complications.

The scan verifies that:

- The operating system is supported for the product.
- On UNIX™ operating systems, the necessary product libraries are installed.
- There is enough permanent and temporary disk space to install both the product and its prerequisites.
- There is enough memory and virtual memory.



Note: The scan verifies only that the environment meets the requirements of IBM Workload Scheduler. It does not check the requirements for other components, such as DB2@.

If any of these checks fails, IBM Workload Scheduler returns an error message.

The log files for the master components are located in:

On Windows™ operating systems:

`<TWA_home>\logs\serverinst<version_number>.log`

On UNIX™ and Linux™ operating systems:

`<TWA_DATA_DIR>/installation/logs/serverinst<version_number>.log`

The log files for the Dynamic Workload Console are located in:

On Windows™ operating systems:

`<DWC_home>\logs\dwcinst<version_number>.log`

On UNIX™ and Linux™ operating systems:

`<DWC_DATA_dir>/installation/logs/dwcinst<version_number>.log`

The log files for the agents are located in:

On Windows™ operating systems:

`<TWA_home>\logs\twsinst<interp><user_name><version_number>.log`

On UNIX™ and Linux™ operating systems:

`<TWA_DATA_DIR>/installation/logs/twsinst<interp><user_name><version_number>.log`

You can decide to rerun the installation or upgrade without executing the prerequisite scan. If you set the **-skipcheckprereq** parameter to `true` when performing the installation, the installation script does not execute the prerequisite scan. If a problem occurs, an error is displayed, the component is installed or upgraded, but might not work. For more information about the `-skipcheckprereq` parameter in all installation scripts, see the reference section in the *IBM Workload Scheduler: Planning and Installation*.

Starting from version 9.5, Fix Pack 2, the prerequisite scan no longer verifies the presence on the local system of 32-bit libraries. However, the extended agent for MVS requires a set of libraries on Linux PPC. You can find the updated list of libraries, in addition to a detailed list of supported operating systems and the most up-to-date product prerequisites, in [IBM Workload Scheduler Detailed System Requirements](#).

Upgrading the Dynamic Workload Console

This section describes how to upgrade the Dynamic Workload Console from version 9.3 or later, to the current version.



When upgrading your IBM® Workload Scheduler environment, it is a good practice to start with the upgrade of the Dynamic Workload Console first. If you upgrade the console to the new product version level, you can then use it to verify that your environment is working after upgrading the remaining components.

With Version 9.5, the Dynamic Workload Console is based on a new architectural foundation that does not include Jazz for Service Management nor Dashboard Application Services Hub, therefore, the upgrade procedure from previous versions involves performing the following tasks:

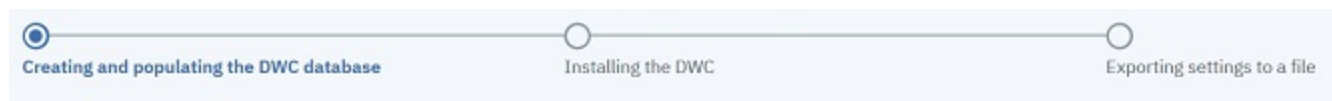
1. Creating and populating the database. Alternatively, by default, the installation script is configured to install and use a Derby database.
2. A fresh installation of the latest product version.
3. Import of the repository settings from the previous Dynamic Workload Console installation.
4. Creating new roles by configuring them to access the Dynamic Workload Console as described in Configuring roles to access the Dynamic Workload Console.

Each Dynamic Workload Console installation also requires creating and populating the database (unless the default Derby database is used), the creation of the IBM® Workload Scheduler administrative user, and the installation of WebSphere Application Server Liberty Base. To complete the installation, you can import the repository settings from your previous console installation to maintain the same customized settings.

Creating and populating the database

By default, the installation script is configured to install and use a Derby database. Alternatively, you can also choose to use any one of the supported databases.

About this task



If you are using the default database Derby, you can skip this step. If you are using a database other than Derby, create and populate the database tables for the Dynamic Workload Console by following the procedure appropriate for your RDBMS:

- [Creating and populating the database for DB2 for the Dynamic Workload Console on page 62](#)
- [Creating the database for Oracle for the Dynamic Workload Console on page 70](#)
- [Creating the database for Informix or OneDB for the Dynamic Workload Console on page 74](#) (supported only on UNIX)
- [Creating and populating the database for MSSQL for the Dynamic Workload Console on page 78](#)

What to do next

Next, create the IBM® Workload Scheduler administrative user and install WebSphere Application Server Liberty Base on the workstation where you plan to install the Dynamic Workload Console.

Installing the Dynamic Workload Console

Procedure for installing two Dynamic Workload Console servers on two separate nodes.

About this task



The procedure to perform a fresh installation is demonstrated through a typical scenario where two Dynamic Workload Console servers are installed on separate workstations, sharing the same remote database.

Procedure for installing the Dynamic Workload Console

About this task

In this scenario, the IBM® Workload Scheduler administrator installs two Dynamic Workload Console instances on two separate workstations, sharing the same remote database. The IBM® Workload Scheduler administrator performs the operations listed below on both workstations.

You can optionally configure your environment in SSL mode, by using the `--sslkeyfolder` and `--sslpassword` parameters and generating automatically the certificates for each workstation in your environment.

The IBM® Workload Scheduler administrator installs the Dynamic Workload Console. The following information is required:

Table 19. Required information

Command parameter	Required information	Provided in..
Database information		
<code>--rdbmstype</code>	database type	Creating and populating the database on page 58
<code>--dbhostname</code>	database hostname	
<code>--dbport</code>	database port	
<code>--dbname</code>	database name	
<code>--dbuser</code>	database user name	
<code>--dbpassword</code>	database password	
WebSphere Application Server Liberty Base information		
<code>--wlpdir</code>	WebSphere Application Server Liberty Base installation directory	Installing WebSphere Application Server Liberty Base on page 55

You can run the `dwcinst` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

Default values are stored in the `dwcinst.properties` file, located in the root directory of the installation image.

If you need to modify any of the default values, edit the `dwcinst.properties` file, but do not modify the `dwcinst.template` file located in the same path.

In a typical installation scenario, it is recommended you install the Dynamic Workload Console as a **non-root user** on UNIX systems and as a **local administrator** on Windows systems.

This user is automatically created by the installation process in the WebSphere Application Server Liberty Base repository. Ensure that the user has full access to the WebSphere Application Server Liberty Base installation directory.

Before starting the Dynamic Workload Console installation, ensure the following steps have been completed:

1. [Installing WebSphere Application Server Liberty Base on page 55](#) on the workstations where you plan to install the Dynamic Workload Console
2. [Creating and populating the database on page 58](#)
3. [Creating the IBM Workload Scheduler administrative user on page 91](#)



Note: To avoid installation failure, ensure that the `inst_dir` parameter is different from the directory of the installation image.

To install the Dynamic Workload Console, perform the following steps:

Start the installation specifying a typical set of parameters:

On Windows operating systems

```
cscript dwcinst.vbs --acceptlicense yes --rdbmstype db_type
--user dwc_admin_user --password dwc_pwd --dbname db_name
--dbuser db_user --dbpassword db_pwd --dbhostname db_hostname
--dbport db_port --wlpdir Liberty_installation_dir\wlp
--sslkeysfolder certificate_files_path --sslpassword keystore_truststore_password
```

On UNIX operating systems

```
./dwcinst.sh --acceptlicense yes --rdbmstype db_type
--user dwc_admin_user --password dwc_pwd --dbname db_name
--dbuser db_user --dbpassword db_pwd --dbhostname db_hostname
--dbport db_port --wlpdir Liberty_installation_dir/wlp
--sslkeysfolder certificate_files_path --sslpassword keystore_truststore_password
```

where,

user *dwc_admin_user*

is the administrator of the Dynamic Workload Console. You can use this account to log in to the Dynamic Workload Console and manage your environment.

password *dwc_pwd*

is the password of the Dynamic Workload Console user.

On Windows operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_) characters, and `()!*~+`.

On UNIX operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_) characters, and ()!?*~+.

Results

You have now successfully installed the Dynamic Workload Console.

For more information about all **dwcinst** parameters and default values, see [Dynamic Workload Console installation - dwcinst script on page 369](#).

What to do next

You can now proceed to [Installing agents on page 103](#).

Exporting the Dynamic Workload Console settings

You can export the Dynamic Workload Console settings repository from an existing Dynamic Workload Console instance (version 9.3 or 9.4) to create a file, in XML format, that can be imported into another Dynamic Workload Console node.

About this task



If you want to maintain the same settings you had in your previous version Dynamic Workload Console (version 9.3 or 9.4), then you can export them to a file and import them into the new installation of the Dynamic Workload Console, at the latest product version level.

To export the Dynamic Workload Console settings from the previous installation and import them into the new installation, follow the procedure.

To export the settings from a Dynamic Workload Console, perform the following procedure.

1. Log in to the Dynamic Workload Console.
2. From the navigation toolbar, click **Administration > Manage Settings**.
3. In the Manage Settings page, click **Export settings** to save the console settings to an XML file in a directory of your choice.
4. Create a new High Availability configuration using the stand-alone server, or join it to an existing configuration.
5. Import the previously exported data to any node in the High Availability configuration by doing as follows:

In the Manage Settings page, click **Import settings** and browse to the XML file containing the data you want to import.

What to do next

Import the settings file into the new Dynamic Workload Console installation.

Installing a new master domain manager configured as a backup

Install a new master domain manager configured as a backup and link it to your current network. Then switch it to become the new master domain manager.

Before you begin



About this task

Complete this procedure to install a fresh master domain manager configured as backup and then link it to your current network. This procedure is supported starting from versions 9.3 or 9.4.

The master domain manager configured as a backup points to your existing IBM Workload Scheduler database and then later becomes your new master domain manager.

During the master domain manager upgrade process, the license model to be applied to the environment is defined. The license model determines the criteria by which your license compliance is calculated. The following pricing models are supported: **byWorkstation**, **perServer**, **perJob**. The default value is **perServer**. To determine the current value of this global option, enter the following command: **optman show ln** or **optman show licenseType**. To modify the pricing model, use the **optman chg ln** or **optman chg licenseType** command. For more information about licensing, see the section about license management in IBM License Metric Tool in *Administration Guide*.

Installing WebSphere Application Server Liberty Base

WebSphere Application Server Liberty Base is required on all workstations where you plan to install the master components and the Dynamic Workload Console.

Before you begin



Ensure that your system meets the operating system and Java requirements. For more information, see WebSphere Application Server Liberty Base detailed system requirements.

About this task

You can quickly install WebSphere Application Server Liberty Base by extracting an archive file on all supported platforms.

To extract the archive, you can use your own Java Ext or use the Java Ext provided with the IBM® Workload Scheduler image. The provided Java Ext is located in the following path in the image for your operating system:

`IMAGE_DIR/TWS/INTERP/Tivoli_Eclipse_INTERP/TWS/JavaExt.`

To install WebSphere Application Server Liberty Base, perform the following steps:

1. Download WebSphere Application Server Liberty Base from [Recommended updates for WebSphere Application Server Liberty](#).

Each WebSphere Application Server Liberty Base image is packaged as a jar file named

```
wlp-base-all-fix_pack.jar
```



Note: To update IBM® Workload Scheduler to version 9.5 Fix Pack 6, the minimum required version of WebSphere® Liberty is 22.0.0.3 or later.

2. Install WebSphere Application Server Liberty Base by extracting the archive file to a directory of your choice.

On Windows operating systems

```
java -jar liberty_download_dir\wlp-base-all-fix_pack.jar
--acceptLicense install_dir
```

On UNIX operating systems

```
java -jar liberty_download_dir/wlp-base-all-fix_pack.jar
--acceptLicense install_dir
```

where:

liberty_download_dir

The directory where you downloaded WebSphere Application Server Liberty Base.

install_dir

The directory where you want to install WebSphere Application Server Liberty Base.



Note: Note that the value of the *install_dir* parameter must match the value to be defined for the **wlpdir** parameter when installing the master domain manager and its backup, dynamic domain manager and its backup, and the Dynamic Workload Console.

3. Ensure the IBM® Workload Scheduler administrative user that you created has the rights to run WebSphere Application Server Liberty Base and full access to the installation directory. If WebSphere Application Server Liberty Base is shared between the master domain manager and the Dynamic Workload Console, ensure also the Dynamic Workload Console user has the same rights.

Results

You have now successfully installed WebSphere Application Server Liberty Base.

What to do next

You can now proceed to [Encrypting passwords \(optional\) on page 210](#).

Encrypting passwords (optional)

How to encrypt passwords required by the upgrade process

About this task



Before you start the installation process, you can optionally encrypt the passwords you will use while installing, upgrading, and managing IBM® Workload Scheduler. The encryption mechanism is based on your WebSphere Application Server Liberty Base installation. You can use either the {xor} or {aes} encoding. For more information, see [Liberty: The limits to protection through password encryption](#).

To encrypt the passwords, proceed as follows:

What to do next

You can now proceed to [Upgrading the database schema on page 211](#).

Upgrading the database schema

Upgrade the master domain manager database tables before upgrading the master component.

Before you begin



Note: Before upgrading the database schema, ensure you have created a backup. Refer to the documentation related to your RDBMS for information about the backup procedure.

You can perform a typical database upgrade procedure using the default values, as described in the following scenario, or you can customize the database parameters, as described in [FAQ - Database customizations on page 214](#).

Ensure you have acquired information about the IBM® Workload Scheduler tablespaces that were specified when the database tables were created and populated the first time. If values different from the default values were used, then your database administrator must provide them for this upgrade procedure. If default values were used, then they do not need to be specified during the upgrade procedure. The default values for the IBM® Workload Scheduler data, log, and plan tablespaces are as follows:

- **--iwstname** `TWS_DATA`
 - For Oracle only, the default is `USERS`
- **--iwslogtsname** `TWS_LOG`
 - For Oracle only, the default is `USERS`
- **--iwsplantsname** `TWS_PLAN`
 - For Oracle only, the default is `USERS`

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

About this task

You can run the `configureDb` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

The script creates an SQL file with all the statements needed to upgrade the IBM® Workload Scheduler database schema to the latest version and, by default, automatically applies it.

Default values are stored in the `configureDb.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `configureDb.properties` file, but do not modify the `configureDb.template` file located in the same path.

To upgrade the IBM® Workload Scheduler database schema, perform the following steps:

1. On the workstation where the master domain manager is installed, extract the IBM® Workload Scheduler package to a directory of your choice.
2. Browse to the `image_location/TWS/interp_name` path.
3. On the workstation where you will install the new backup master domain manager that will then switch to become the current active master domain manager, type the following command to upgrade the IBM® Workload Scheduler database schema. Ensure that you use the same database administrator credentials you used when the IBM® Workload Scheduler database schema objects were created.

DB2**On Windows operating systems**

```
cscript configureDb.vbs --rdbmstype DB2 --dbhostname db_hostname --dbport db_port
--dbname db_name --dbuser db_user --dbpassword db_password
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
--iwststname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype DB2 --dbhostname db_hostname --dbport db_port
--dbname db_name --dbuser db_user --dbpassword db_password
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
--iwststname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
```

Oracle**On Windows operating systems**

```
cscript configureDb.vbs --rdbmstype ORACLE --dbname service_name
--dbuser db_user --dbpassword db_password --dbhostname db_hostname
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
--iwststname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype ORACLE --dbname service_name
--dbuser db_user --dbpassword db_password --dbhostname db_hostname
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
```

```
--iwsname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
```

Informix

On UNIX operating systems

```
./configureDb.sh --rdbmstype IDS --dbname db_name --dbuser db_user
--dbpassword db_password --dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
--iwsname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
```

MSSQL

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype MSSQL --dbhostname db_hostname
--dbport db_port
--dbname db_name --dbuser db_user --dbpassword db_password
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
--iwsname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
--auth_type SQLSERVER
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype MSSQL --dbhostname db_hostname --dbport db_port
--dbname db_name --dbuser db_user --dbpassword db_password
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
--iwsname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
--auth_type SQLSERVER
```

where:

--rdbmstype

The database vendor.

--dbhostname *db_hostname*

The host name or IP address of database server.

--dbport *db_port*

The port of the database server.

--dbname *db_name*

The name of the IBM® Workload Scheduler database.

--dbuser *db_user*

The user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--dbpassword *db_password*

The password for the user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--dbadminuser *db_admin_user*

The database administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--dbadminuserpw *db_admin_password*

The password of the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--iwststname *tablespace_data*

The name of the tablespace for IBM® Workload Scheduler data. The default value for all supported RDBMS is TWS_DATA, with the exception of Oracle where the default is USERS.

--iwslogstname *tablespace_log*

The name of the tablespace for the IBM® Workload Scheduler log. The default value for all supported RDBMS is TWS_LOG, with the exception of Oracle where the default is USERS.

--iwsplantsname *db_port*

The name of the tablespace for the IBM® Workload Scheduler plan. The default value for all supported RDBMS is TWS_PLAN, with the exception of Oracle where the default is USERS.

--auth_type *db_name*

The MSSQL authentication mode. The default is SQLSERVER which uses native SQL authentication.



Note: The following parameters specified with the configureDb command are also required when you upgrade the master components with the serverinst command and their values must be the same:

- **rdbmstype**
- **dbhostname**
- **dbport**
- **dbname**
- **dbuser**
- **dbpassword**

Results

You have now successfully upgraded the database schema for the IBM® Workload Scheduler database.

What to do next

You can now proceed to [Creating the IBM Workload Scheduler administrative user on page 216](#).

FAQ - Database customizations

A list of questions and answers related to the customization of the database:

When creating and populating a database, you might have the need to customize some parameters to suit your environment.

- [What if my 9.4.x database is configured for Windows authentication on page 215](#)
- [What if my database server does not support the drivers supplied with the product images? on page 215](#)

What if my 9.4.x database is configured for Windows authentication

Upgrading a database that is configured for Windows authentication.

By default, the procedure to create and update the database schema for MSSQL uses the native SQL authentication (as specified by the parameter passed to the configureDb script, **auth_type=SQLSERVER**). If your database is configured for Windows authentication, then submit the configureDb script to upgrade the database schema as follows:

1. Browse to the folder containing the configureDb command. The command is located in the following path, depending on the component for which you are installing:

master domain manager

image_location/TWS/interp_name

Dynamic Workload Console

image_location

2. When launching the configureDb command, as explained in [Creating and populating the database on page 58](#), specify the **auth_type** argument with the following value:

WINDOWS

Enables Windows authentication type. The Windows user you used to log on to the workstation is assigned the grants to administer the IBM® Workload Scheduler database.

What if my database server does not support the drivers supplied with the product images?

Database server does not support JDBC driver supplied with the product images.

By default, the configureDb command references the JDBC drivers supplied with the product images. If your database server is not compatible with the supplied drivers, then contact your database administrator for the correct version to use with your database server and specify the driver path using this optional parameter: **dbdriverpath db_driver_path**. Ensure the JDBC drivers are not deleted from this path as they are referenced and used by the product.

Proceed as follows:

1. Browse to the folder containing the configureDb command. The command is located in the following path, depending on the component for which you are installing:

master domain manager

image_location/TWS/interp_name

Dynamic Workload Console

image_location

- When launching the `configureDb` command to configure the database, as explained in [Creating and populating the database on page 58](#), specify the following argument:

`dbdriverpath db_driver_path`

The path where the database drivers are stored. This parameter is optional. By default, the configuration script references the JDBC drivers supplied with the product images.

- When launching the `serverinst` command to install the master domain manager, as explained in [Installing the master domain manager and backup master domain manager on page 92](#), specify the **`dbdriverpath`** argument with the same value specified for the `configureDb` command.
- When launching the `dwcinst` command to install the Dynamic Workload Console, as explained in [Installing the Dynamic Workload Console servers on page 100](#), specify the **`dbdriverpath`** argument with the same value specified for the `configureDb` command.

For more information about the installation commands, see [Reference on page 345](#).

Creating the IBM® Workload Scheduler administrative user

Instructions to create the IBM® Workload Scheduler administrative user



IBM® Workload Scheduler administrative user

The IBM® Workload Scheduler administrator creates the administrative user (**`wauser`**). The administrative user is the user for which the product will be installed in the subsequent steps. This implies that this user has full access to all scheduling objects.

The user name can contain alphanumeric, dash (-), and underscore (_) characters; it cannot contain national characters. The first character of the user name must be a letter.

The following considerations apply:

On Windows operating systems:

- If this user account does not already exist, it is automatically created at installation time.
- If installing on a Windows™ server in a domain, do not define a domain and local ID with the same user name.
- If you specify a domain user, define the name as *domain_name\user_name*.
- If you specify a local user, define the name as *system_name\user_name*. Type and confirm the password.

On UNIX and Linux operating systems:

This user account must be created manually before running the installation and must be enabled to login to the machine where the master domain manager is going to be installed. Create a user with a home directory and group. Use the appropriate UNIX and Linux operating system commands to create the user.

For more information, see [IBM Workload Scheduler user management on page 50](#).

What to do next

You can now proceed to [Installing the master domain manager as a backup master domain manager on page 217](#).

Installing the master domain manager as a backup master domain manager

A fresh installation for the master domain manager and the backup master domain manager

Before you begin

Before beginning the installation, ensure you have completed the following steps:

1. [Installing WebSphere Application Server Liberty Base on page 209](#)
2. [Encrypting passwords \(optional\) on page 210](#)
3. [Upgrading the database schema on page 211](#)
4. [Creating the IBM Workload Scheduler administrative user on page 216](#)

About this task

You install a master domain manager at the latest product version level configured as the new backup master domain manager by running the serverinst script. The installation process is able to detect the presence of an existing master domain manager and automatically configures this one as the backup master domain manager. The new backup master domain manager is configured to point to the existing database instance.

The IBM® Workload Scheduler administrator installs the master domain manager as the backup. The following information is required:

Table 20. Required information

Command parameter	Information type	Provided in..
Database information		
--rdbmstype	database type	Upgrading the database schema on page 211
--dbhostname	database hostname	

Table 20. Required information

(continued)

--dbport	database port	
--dbname	database name	
--dbuser	database user name	
--dbpassword	database password	
IBM® Workload Scheduler information		
--wuser	IBM® Workload Scheduler administrative user name	Creating the IBM Workload Scheduler administrative user on page 216
--wapassword	IBM® Workload Scheduler administrative user password	
WebSphere Application Server Liberty Base information		
--wlpdir	WebSphere Application Server Liberty Base installation directory	Installing WebSphere Application Server Liberty Base on page 209

For more information about all of the **serverinst** parameters and default values, see [Master components installation - serverinst script on page 357](#).

Default values are stored in the `serverinst.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `serverinst.properties` file, but do not modify the `serverinst.template` file located in the same path.

To install the master domain manager as a backup, perform the following steps:

1. Log in as root or Administrator to the workstation where you plan to install.
2. Browse to the folder where the `serverinst` command is located in `image_location/TWS/interp_name`.
3. Start the installation specifying a typical set of parameters. In this case, default values are used for all remaining parameters:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --rdbmstype <db_type>
--dbhostname <db_hostname> --dbport <db_port> --dbname <db_name>
--dbuser <db_user> --dbpassword <db_password> --wuser <wa_user>
--wapassword <wa_password> --wlpdir <Liberty_installation_dir>\wlp
--sslkeysfolder <certificate_files_path> --sslpassword <keystore_truststore_password>
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --rdbmstype <db_type>
--dbhostname <db_hostname> --dbport <db_port> --dbname <db_name>
--dbuser <db_user> --dbpassword <db_password> --wuser <wa_user>
--wapassword <wa_password> --wlpdir <Liberty_installation_dir>/wlp

--sslkeysfolder <certificate_files_path> --sslpassword <keystore_truststore_password>
```

where

--acceptlicense

Specify **yes** to accept the product license.

--rdbmstype|-r *rdbms_type*

The database type. Supported databases are:

- db2
- oracle
- ids (informix, only on UNIX operating systems)
- mssql

This parameter is optional. The default value is **db2**.

--dbhostname *db_hostname*

The host name or IP address of database server.

--dbport *db_port*

The port of the database server.

--dbname *db_name*

The name of the IBM® Workload Scheduler database.

--dbuser *db_user*

The database user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--dbpassword *db_password*

The password for the user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--wuser *user_name*

The user for which you are installing IBM Workload Scheduler.

--wapassword *wuser_password*

The password of the user for which you are installing IBM Workload Scheduler.

On Windows operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_), characters, and ()|?*~+.

On UNIX operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_), characters, and ()|?=*~+.

--wlpdir

The path where WebSphere Application Server Liberty Base is installed.

--sslkeyfolder

The name and path of the folder, containing either the keystore (`TWSServerKeyFile.jks`), the key database (`TWSClientKeyStore.kdb`), and the truststore (`TWSServerTrustFile.jks`, `TWSClientKeyStoreJKS.jks`) files, you need to provide when supplying custom certificates (only on UNIX operating systems), or certificates in .PEM format:

- Only on UNIX operating systems, if you provide the keystore and truststore files, these files are used to configure SSL communication using the passwords you provide with the **--keystorepassword** and **--truststorepassword** respectively.



Note: When installing using the keystore, key database, and truststore files, you are required to manually configure these files prior the installation setup. If providing custom .jks files, it is your responsibility to provide such .jks files equipped with all the CA certificates they need in the truststore. For these reasons, this procedure is not recommended.

- If you provide .PEM certificates, the installation program automatically generates the keystore and truststore files using the password you specify with the **--sslpassword** parameter. The folder must contain the following files:
 - **ca.crt**
The Certificate Authority (CA) public certificate.
 - **tls.key**
The private key for the instance to be installed.
 - **tls.crt**
The public part of the previous key.

You can optionally create a subfolder to contain one or more *.crt files to be added to the server truststore as trusted CA. This can be used for example to add to the list of trusted CAs the certificate of the LDAP server or DB2 server. Additionally, you can store here any intermediate CA certificate to be added to the truststore. The subfolder must be named **additionalCAs**.

This parameter is required if you set the **--dbsslconnection** parameter to true.

--sslpassword

If you provide .PEM certificates with the **--sslkeyfolder** parameter, this is the password for the certificates automatically generated by the installation program. This parameter is mutually exclusive with the **keystorepassword** and **truststorepassword** parameters, which apply when you provide the keystore and truststore files using the **sslkeyfolder** parameter.



Note: The values for the following parameters must match the values you provided when creating and populating the database:

- **--rdbmstype**
- **--dbhostname**
- **--dbport**
- **--dbname**
- **--dbuser**
- **--dbpassword**

See [Creating and populating the database on page 58](#), then follow the link to the database vendor you are using for more information about command parameters.



Note: Before starting the deployment of a new master domain manager or backup master domain manager on an already used database, be sure that no failed plan creation/extension has been performed. If a failed plan creation/extension has been performed, resolve the failure before attempting the new deployment or unlock the database by running the `planman unlock db` command.

4. To verify that the installation completed successfully, browse to the directory where you installed the master domain manager and type the following commands:

```
./tws_env.sh
```

```
optman ls
```

This command lists the IBM® Workload Scheduler configurations settings and confirms that IBM® Workload Scheduler installed correctly.

Results

You have now successfully installed the master domain manager as the backup master domain manager.

What to do next

You can now proceed to [Configuring security on page 221](#).

Configuring security

Configuring security on the new backup master domain manager.

About this task



After you have installed the new backup master domain manager at the current product level, you need to manage user access and security. By default, IBM Workload Scheduler is configured to use a local file-based user repository.

You can implement a basic user registry or an LDAP-based user repository by configuring the sample authentication templates provided in XML format. The following are the supported authentication methods and the corresponding sample template that can be configured to replace the configuration file currently in use:

- File-based: `auth_basicRegistry_config.xml`
- IBM® Directory Server: `auth_IDS_config.xml`
- OpenLDAP: `auth_OpenLDAP_config.xml`
- Windows Server Active Directory: `auth_AD_config.xml`

You can further customize the templates by adding additional elements to the XML files. For a full list of the elements that you can configure to complement or modify the configuration, see the related WebSphere Application Server Liberty Base documentation, for example [LDAP User Registry \(IdapRegistry\)](#).

Configuring an LDAP user registry

About this task

To configure a common LDAP for both the IBM® Workload Scheduler and the Dynamic Workload Console, complete the following steps:

1. Assign a role to your LDAP group.
 - a. Log in to the Dynamic Workload Console as administrator and access the **Manage Roles** page.
 - b. Add a new **Entity** of type **Group** to the role you want to assign to your LDAP group and click **Save**.
2. Update the authentication configuration template file with the details about your LDAP server.
 - a. Copy the template file to a working directory. The templates are located in the following path:

Dynamic Workload Console

```
DWC_DATA_dir/usr/servers/dwcServer/configDropins/templates/authentication
```

master domain manager

```
TWA_DATA_DIR/usr/servers/engineServer/configDropins/templates/authentication
```

Dynamic Workload Console

```
DWC_home\usr\servers\dwcServer\configDropins\templates\authentication
```

master domain manager

```
TWA_home\usr\servers\engineServer\configDropins\templates\authentication
```

- b. Edit the template file in the working directory with the desired configuration.
- c. Optionally, create a backup copy of the configuration file in a different directory, if the file is already present. To avoid conflicts, ensure the backup copy is in a directory different from the following directories: `configDropins/templates` and `configDropins/overrides`.
- d. Copy the updated template file to the `overrides` directory.
- e. The `overrides` directory is located in the following path:

Dynamic Workload Console

```
DWC_DATA_dir/usr/servers/dwcServer/configDropins/overrides
```

master domain manager

```
TWA_DATA_DIR/usr/servers/engineServer/configDropins/overrides
```

Dynamic Workload Console

```
DWC_home\usr\servers\dwcServer\configDropins\overrides
```

master domain manager

```
TWA_home\usr\servers\engineServer\configDropins\overrides
```

- f. Stop and restart WebSphere Application Server Liberty Base using the `stopappserver` and `startappserver` commands located in `TWA_home/appservertools`.

For more information about configuring an LDAP registry, see the WebSphere Application Server Liberty Base documentation, for example: [Configuring LDAP user registries in Liberty](#) and [Federation of user registries](#).

Configuring a basic user registry

About this task

You can use a basic user registry by defining the users and groups information for authentication on WebSphere Application Server Liberty Base.

To configure basic user registry, complete the following steps:

1. Copy the `auth_basicRegistry_config.xml` template from the `templates` folder to a working folder.
2. Edit the template file in the working folder with the desired configuration by adding users and groups as necessary.

To add a user, add an entry similar to the following in the **basicRegistry** section:

```
<user name="nonadminuser" password="{xor}Ozo5PiozKw==" />
```

To add a group, add an entry similar to the following in the **basicRegistry** section:

```
<group name="TWSUsers">
  <member name="nonadminuser"/>
</group>
```

3. Store the password in xor format using the WebSphere Application Server Liberty Base securityUtility command, as described in [securityUtility command](#).

This utility requires the JAVA_HOME environment variable to be set. If you do not have Java installed, you can optionally use the Java version provided with the product and available in:

IBM® Workload Scheduler

```
<INST_DIR>/TWS/JavaExt/jre/jre
```

Dynamic Workload Console

```
<DWC_INST_DIR>/java/jre/bin
```

4. Create a backup copy of the configuration file in the `overrides` folder, if already present.
5. Copy the updated template file to the `overrides` folder. Maintaining the original folder structure is not required.

Completing the security configuration for the new environment

Configuring the security file on the new backup master domain manager.

About this task



To complete the security configuration for the new environment, there are a few tasks to complete that can vary depending on whether you are using the default role-based security model, or the classic security model.

Role-based security model

Grant users access to all of the objects associated to the domain and to folders. For example, to grant full access to all objects in the domain and on all folders, create an Access Control list for the users to which you want to give access

1. Grant users access to all of the objects associated to the domain and to objects in the root (/) folder. For example, to grant full access to all objects in the domain and on all folders, create an Access Control list for the users to which you want to give access:
 - a. From the Dynamic Workload Console, open the **Manage Workload Security** panel and select **Give access to users and groups**.
 - b. Select the group from the drop-down list and then select **FULLCONTROL** in the field **Role**.
 - c. Select **Domain** and assign **ALLOBJECTS**.
 - d. Click **Save and create new**.

- e. Select the group from the drop-down list and then select **FULLCONTROL** in the field **Role**.
- f. Select **Folder** and then assign the root by clicking **/**.
- g. Click **Save**.

Classic security model

If you use the classic security model and have specific security settings in your current environment, these settings must be manually merged with the new settings before you build the final security file to be used in your new environment. The statements you might have to add manually vary depending on your specific security settings.

To manually merge the new settings, complete the following procedure:

1. Log in as *TWS_user* on your upgraded master domain manager and set the IBM Workload Scheduler environment.
2. If you have centralized security enabled, extract the new security file on the master using the command:

```
dumpsec > sec_file
```

where *sec_file* is the text file created by the dumpsec command.

3. Edit the *sec_file*, and insert the following statements in all of the stanzas in the file:

Folder

```
FOLDER NAME=/ ACCESS=ADD,DELETE,DISPLAY,MODIFY,USE,LIST,UNLOCK, ACL
```

Folder access must be given to scheduling objects and access to the folder in which the workstation is defined must be given for the JOB, SCHEDULE, USEROBJ, RESOURCE, and PARAMETER objects:

```
job          cpu=@ + folder = / + cpufolder = / access=@
schedule     cpu=@ + folder = / + cpufolder = / access=@
cpu          cpu=@ + folder = / access=@
userobj      cpu=@ + cpufolder = / access=@
resource     cpu=@ + folder = / + cpufolder = / access=@
prompt       + folder = / access=@
calendar     + folder = / access=@
eventrule    name=@ + folder = /
             access=add,delete,display,modify,list,unlock
parameter    cpu=@ + folder = / + cpufolder = / access=@
runcygrp     name=@ + folder = /
             access=add,delete,display,modify,use,list,unlock
vartable     name=@ + folder = /
             access=add,delete,display,modify,use,list,unlock
wkldappl     name=@ + folder = /
             access=add,delete,display,modify,list,unlock
```

Workload application

```
WKLDAPPL NAME=@ + FOLDER = / ACCESS=ADD,DELETE,DISPLAY,MODIFY,LIST,UNLOCK
```

Run cycle group

```
RUNCYGRP NAME=@ + FOLDER = / ACCESS=ADD,DELETE,DISPLAY,MODIFY,USE,LIST,UNLOCK
```

Centralized agent update

Replace the statement:

```
CPU CPU=@
ACCESS=ADD,CONSOLE,DELETE,DISPLAY,FENCE,LIMIT,LINK,MODIFY,SHUTDOWN,
START,STOP,UNLINK,LIST,UNLOCK,RUN,RESEFTTA
```

with the following statement:

```
CPU CPU=@ + FOLDER = /
ACCESS=ADD,CONSOLE,DELETE,DISPLAY,FENCE,LIMIT,LINK,MODIFY,SHUTDOWN,
START,STOP,UNLINK,LIST,UNLOCK,RUN,RESEFTTA,MANAGE
```

Adding members to workstation class

Following the upgrade, to create or modify workstation classes, you must add USE access to CPU objects that are members, or that will be added as members to a workstation class.

```
CPU CPU=@ + FOLDER = /
ACCESS=ADD,CONSOLE,DELETE,DISPLAY,FENCE,LIMIT,LINK,MODIFY,SHUTDOWN,
START,STOP,UNLINK,LIST,UNLOCK,RUN,RESEFTTA,MANAGE,USE
```

4. Check that the user permissions of the new statements are correct and, if necessary, add the user of your old master domain manager to the security file of the master you just upgraded.
5. Due to new support of the UPN Windows user, if you have Windows domain users that are defined in the logon fields as `domain\username`, insert the escape character `'\'` before the `'\'` character in the `domain\username` value. For example, if you use the `MYDOMAIN\user1` value in the logon field, after the upgrade, in the `Security` file you must update the line in following way:

```
.....
logon=MYDOMAIN\\user1
.....
```

6. Save your changes to the `sec_file`.
7. Build your final security file for your new master domain manager using the `makesec` command:

```
makesec sec_file
```

8. If you have centralized security enabled, distribute the security file.

Run `JnextPlan -for 0000` to distribute the Symphony file to the agents.



Note: Ensure that the `optman cf` option is set to all or only the unfinished job streams are carried forward.

9. Restore the previous setting of the `optman cf` option, if necessary.



Note: When a backup master domain manager is installed and the role-based security is configured, the default security file is used.

To change the security settings on the backup master domain manager, perform one of the following tasks:



- Copy the security file from master domain manager to backup master domain manager.
 1. Make the switch manager permanent.
 2. Open the Manage roles page in the Dynamic Workload Console.
 3. Select a role and click OK, without making any changes. As a result, the security file is updated.

What to do next

You can now proceed to [Making the switch manager permanent on page 228](#).

Switching the master domain manager to the new backup master

About this task

To switch the back-level master domain manager to the new backup master domain manager, complete the following procedure:

1. Start WebSphere Application Server Liberty Base on the new backup master domain manager by running the startAppServer script found in the following path:

```
<TWA_HOME>/appservertools/startAppServer.sh
```

2. Before you switch your master domain manager to the new backup master domain manager, you must stop the dynamic workload broker server on the current back-level master domain manager:

On Windows™ operating systems

```
Use wstool stopBrokerApplication.bat
```

On UNIX® operating systems

```
Use wstool stopBrokerApplication.sh
```

3. Switch to your new backup master domain manager, which now becomes your current active master domain manager, by issuing the following command from either the Dynamic Workload Console or the **command line** of your old master domain manager:

From the Dynamic Workload Console

In the navigation tree, click **Monitoring and Reporting > Monitor Workload >** select the engine and the object type Workstation, click run and, in the table of results, select backup master domain manager workstation name, click **More Actions**, and select **Become Master Domain Manager**.

From the command line of the old master domain manager

Issue the following command:

```
conman "switchmgr masterdm;new_mgr_cpu"
```

where *new_mgr_cpu* is the backup master domain manager workstation name.

- Switch the event processor from the old master domain manager to the backup master domain manager, by running the following command from either the Dynamic Workload Console or the **command line** of your old master domain manager:

From the Dynamic Workload Console

In the navigation tree, click **Monitoring and Reporting > Monitor Workload >** select the engine and the object type Workstation, click run and, in the table of results, select backup master domain manager workstation name, click **More Actions**, and select **Become Event Processor**.

From the command line of the old master domain manager

Issue the following command:

```
conman "switcheventprocessor new_mgr_cpu"
```

where *new_mgr_cpu* is the backup master domain manager workstation name.

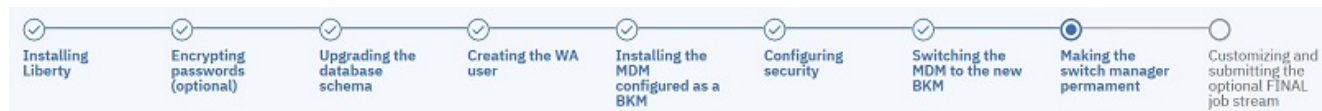
Results

Once you have switched the master domain manager to the new backup master, you can make this switch permanent. For details, see [Making the switch manager permanent on page 228](#).

For more detailed information about switching the master domain manager, see the related topic in the *Administration Guide*

Making the switch manager permanent

About this task



In the procedure [Switching the master domain manager to the new backup master on page 227](#), you switched your master domain manager promoting your new version backup master domain manager to the role of master domain manager.

To make this configuration fully operational and persistent through **JnextPlan**, you must complete the following procedure:

On the new master domain manager, referred to as *new_mgr_cpu*:

- Edit the *localopts* file and modify the following entry as shown:

```
DEFAULTWS=new_mgr_cpu
```

where *new_mgr_cpu* is the workstation name of the new master domain manager. For more information about *localopts* file, see the section about setting local options in *Administration Guide*.

- Change the workstation definition of the old master by running:

```
composer modify cpu=old_mgr_cpu
```

and in the definition substitute *type=manager* with *type=fta*

- Change the workstation definition of the new master by running:

```
composer modify cpu=new_mgr_cpu
```

and in the definition substitute `type=fta` with `type=manager`.

4. Ensure that the `optman cef` option is set to `all`.
5. Rebuild the plan to activate the changes to the database:

```
JnextPlan -for 0000
```

6. Restore the previous setting of the `optman cef` option, if necessary.

What to do next

Once you have made the switch manager permanent, you must run the FINAL job stream on the new master domain manager.

You can now proceed to [Customizing and submitting the optional FINAL job stream on page 229](#).

Customizing and submitting the optional FINAL job stream

About this task



The upgrade process writes the latest FINAL and FINALPOSTREPORTS definitions for the current release in the following file:

`<TWA_HOME>/TWS/config/Sfinal`, where `<TWA_HOME>` is the IBM Workload Scheduler installation directory. To use these latest definitions, you must merge the functions of your current FINAL and FINALPOSTREPORTS job streams with the syntax of your new FINAL and FINALPOSTREPORTS job streams. Complete the following procedure:

1. Depending on your situation, edit your current final job streams and customize the new final job streams as follows:

If you had customized job streams called FINAL and FINALPOSTREPORTS in your database:

- a. Extract the definitions from the current FINAL and FINALPOSTREPORTS job streams file by using composer.
- b. Use a text editor to edit your customized FINAL and FINALPOSTREPORTS job streams.
- c. Merge the job streams with file `<TWA_HOME>/TWS/config/Sfinal` so that the new FINAL and FINALPOSTREPORTS job streams have the same customization as your customized final job streams plus the new required attributes provided by the new FINAL and FINALPOSTREPORTS job streams.
- d. Save your new FINAL and FINALPOSTREPORTS job streams by using composer.

If you had customized final job streams called something other than FINAL and FINALPOSTREPORTS in your database:

- a. Extract the definitions from your customized final job stream files by using composer.
- b. Use a text editor to edit your customized final job stream files.
- c. Merge the job streams with file `<TWA_HOME>/TWS/config/Sfinal` so that the new FINAL and FINALPOSTREPORTS job streams have the same customization as your customized final job

streams plus the new required attributes provided by the new FINAL and FINALPOSTREPORTS job streams.

- d. Save these new final job streams so that they have the same names as your current customized final job streams by running the command `composer -replace`.

If you had final job streams called something other than FINAL and FINALPOSTREPORTS in your database, but they are not customized:

- a. Make a copy of file `<TWA_HOME>/TWS/config/Sfinal`.
- b. Edit this copy and rename the FINAL and FINALPOSTREPORTS parameters with the actual names.
- c. Run the command `composer -replace`.

If you had final job streams called FINAL and FINALPOSTREPORTS in your database, but they are not customized:

Run the command `composer -replace <TWA_HOME>/TWS/config/Sfinal`.

If you had final job streams called FINAL and FINALPOSTREPORTS but they are in DRAFT in your database:

Run the command `composer -replace` and, after the upgrade, change these job streams into the DRAFT status again.

2. After you customized the new final job streams, you must delete your current final job stream instances (`conman cancel sched command`) and submit the new final job stream instances (`conman sbs sched command`).

During the upgrade, JnextPlan is overwritten even if you customized it. The existing JnextPlan is backed up and renamed to:

On Windows™ operating systems:

JnextPlan.cmd.bk

On UNIX™ and Linux™ operating systems:

JnextPlan.bk

FAQ - Master domain manager switching back

A list of questions and answers related to the switching back of the master domain manager:

When switching the master domain manager to a previous version, you need to modify the `server.xml` file.

Switching the master domain manager to the previous version

Switching a master domain manager to the version 9.4.x after being upgraded to version 9.5.x.



Note: If you used the new functions introduced with the latest release, you cannot switch your environment to the previous version because new records have been created in the database and they are not compatible with previous versions.

If you upgraded the master domain manager to the version 9.5.x and you want to switch it to the version 9.4.x, proceed as follows:

1. Ensure that the broker version 9.4.x is stopped by running the `checkBrokerApplicationStatus` command located in the following path:

On UNIX operating systems

```
TWA_home>/wastools
```

On Windows operating systems

```
TWA_home>\wastools
```

2. Open the `server.xml` file located in the following path:

On UNIX operating systems

```
<TWA_home>/usr/servers/engineServer
```

On Windows operating systems

```
<TWA_home>\usr\servers\engineServer
```

3. Comment the following piece of code:

```
<enterpriseApplication id="SchedulerEAR" location="SchedulerEAR.ear" name="SchedulerEAR">
  <classloader commonLibraryRef="DBDriverLibs" delegation="parentFirst"
privateLibraryRef="libs.sdo, libs.plugin, twa-properties, libs.ccmdb, libs.emf, libs.jlog, libs.act,
libs.cars"/>
  <ejb-jar-bnd moduleName="JDEJB">
    .
    .
  </session>
  <session name="JobManagerBean" id="JobManagerBean">
    .
  </session>
</ejb-jar-bnd>
<ejb-jar-bnd moduleName="RAEJB">
  .
  .
  </session>
  <session name="AllocationManagerBean" id="AllocationManagerBean">
    .
  </session>
</ejb-jar-bnd>
<ejb-jar-bnd moduleName="TWSAgent">
  <session name="TWSAgentStartupBean" id="TWSAgentStartupBean">
    .
  </session>
```

```

        <session name="TWSJobManagerBean" id="TWSJobManagerBean">
            .
        </session>
    </ejb-jar-bnd>
    <web-bnd moduleName="JobManagerRESTWeb">
        .
    </web-bnd>
</enterpriseApplication>

```

4. Restart WebSphere Application Server Liberty Base, as described in Application server - starting and stopping in *Administration Guide*.
5. Switch to the 9.4 version using the switchmgr command. For further information see [Switching a master domain manager or dynamic domain manager](#).
6. Start the broker version 9.4.x by running the startBrokerApplication.sh command in the following path:

On UNIX operating systems

TWA_home>/wastools

On Windows operating systems

TWA_home>\wastools



Note: For further information about the complete syntax of startBrokerApplication.sh, see [Starting, stopping, and displaying dynamic workload broker status](#).

If you want to come back to use the master domain manager version 9.5.x, you need to:

1. Stop the broker application on the master domain manager by running the following command:
stopBrokerApplication.sh.
2. Uncomment the part that you previously commented in the *server.xml* file.
3. Switch the backup master domain manager and the master domain manager. For further information see [Switching a master domain manager or dynamic domain manager](#).

Installing a new backup master domain manager

Upgrading your old master domain manager, which is now your current backup master domain manager to the latest product version level.

About this task



Now that you have a new master domain manager installed at the latest product version level, you can upgrade your old, previous version 9.3 or 9.4 master domain manager, which is currently your backup master domain manager, to the latest product version to become the new backup master domain manager. You do this by installing a new backup master domain manager. Ensure you specify the same user as the one specified for the master domain manager.



Note: If you want to minimize the number of workstations required, you can install the new backup master domain manager on the same workstation where your old master domain manager was running. Ensure you stop any running processes related to the previous product version before installing the new backup master domain manager. See [Stopping scheduling processes on page 233](#).

Complete the following procedure:

1. **Install WebSphere Application Server Liberty Base** following the procedure in [Installing WebSphere Application Server Liberty Base on page 233](#).
2. **Optionally encrypt your passwords**, as described in [Encrypting passwords \(optional\) on page 235](#).
3. **Create the IBM® Workload Scheduler administrative user** as described in [Creating the IBM Workload Scheduler administrative user on page 216](#).
4. **Install a new backup master domain manager** at the latest product version level by following the instructions provided in: [Installing the master domain manager and backup master domain manager on page 92](#). The installation detects the presence of the master domain manager and automatically installs a master domain manager configured as the new backup. The new backup master domain manager is configured to connect to your current database instance.
5. **Complete the security configuration of your upgraded backup master domain manager** by following the instructions provided in: [Completing the security configuration for the new environment on page 233](#).
6. **Uninstall the old backup master domain manager** at the previous product version level by following the instructions provided in [Uninstalling a backup master domain manager on page 334](#).

Installing WebSphere Application Server Liberty Base

WebSphere Application Server Liberty Base is required on all workstations where you plan to install the master components and the Dynamic Workload Console.

Before you begin



Ensure that your system meets the operating system and Java requirements. For more information, see [WebSphere Application Server Liberty Base detailed system requirements](#).

About this task

You can quickly install WebSphere Application Server Liberty Base by extracting an archive file on all supported platforms.

Install WebSphere Application Server Liberty Base on all of the following workstations, which comprise a typical installation:

- master domain manager
- backup domain manager
- two Dynamic Workload Console installations on two separate workstations

To extract the archive, you can use your own Java Ext or use the Java Ext provided with the IBM® Workload Scheduler image. The provided Java Ext is located in the following path in the image for your operating system:

`IMAGE_DIR/TWS/INTERP/Tivoli_Eclipse_INTERP/TWS/JavaExt.`

To install WebSphere Application Server Liberty Base, perform the following steps:

1. Download WebSphere Application Server Liberty Base from [Recommended updates for WebSphere Application Server Liberty](#).

Each WebSphere Application Server Liberty Base image is packaged as a jar file named

```
wlp-base-all-fix_pack.jar
```



Note: To update IBM® Workload Scheduler to version 9.5 Fix Pack 6, the minimum required version of WebSphere® Liberty is 22.0.0.3 or later.

2. Install WebSphere Application Server Liberty Base by extracting the archive file to a directory of your choice.

On Windows operating systems

```
java -jar liberty_download_dir\wlp-base-all-fix_pack.jar
--acceptLicense install_dir
```

On UNIX operating systems

```
java -jar liberty_download_dir/wlp-base-all-fix_pack.jar
--acceptLicense install_dir
```

where:

liberty_download_dir

The directory where you downloaded WebSphere Application Server Liberty Base.

install_dir

The directory where you want to install WebSphere Application Server Liberty Base.



Note: Note that the value of the *install_dir* parameter must match the value to be defined for the **wlpdir** parameter when installing the master domain manager and its backup, dynamic domain manager and its backup, and the Dynamic Workload Console.

3. Ensure the IBM® Workload Scheduler administrative user that you created has the rights to run WebSphere Application Server Liberty Base and full access to the installation directory. If WebSphere Application Server Liberty Base is shared between the master domain manager and the Dynamic Workload Console, ensure also the Dynamic Workload Console user has the same rights.

Results

You have now successfully installed WebSphere Application Server Liberty Base.

What to do next

You can now proceed to [Encrypting passwords \(optional\) on page 235](#).

Encrypting passwords (optional)

How to encrypt passwords required by the upgrade process

About this task



Before you start the installation process, you can optionally encrypt the passwords you will use while installing, upgrading, and managing IBM® Workload Scheduler. The encryption mechanism is based on your WebSphere Application Server Liberty Base installation. You can use either the `{xor}` or `{aes}` encoding. For more information, see [Liberty: The limits to protection through password encryption](#).

To encrypt the passwords, proceed as follows:

What to do next

You can now proceed to [Creating the IBM Workload Scheduler administrative user on page 235](#).

Creating the IBM® Workload Scheduler administrative user

Instructions to create the IBM® Workload Scheduler administrative user



IBM® Workload Scheduler administrative user

The IBM® Workload Scheduler administrator creates the administrative user (**wauser**). The administrative user is the user for which the product will be installed in the subsequent steps. This implies that this user has full access to all scheduling objects.

The user name can contain alphanumeric, dash (-), and underscore (_) characters; it cannot contain national characters. The first character of the user name must be a letter.

The following considerations apply:

On Windows operating systems:

- If this user account does not already exist, it is automatically created at installation time.
- If installing on a Windows™ server in a domain, do not define a domain and local ID with the same user name.
- If you specify a domain user, define the name as *domain_name\user_name*.
- If you specify a local user, define the name as *system_name\user_name*. Type and confirm the password.

On UNIX and Linux operating systems:

This user account must be created manually before running the installation and must be enabled to login to the machine where the master domain manager is going to be installed. Create a user with a home directory and group. Use the appropriate UNIX and Linux operating system commands to create the user.

For more information, see [IBM Workload Scheduler user management on page 50](#).

What to do next

You can now proceed to [Installing the new backup master domain manager on page 236](#).

Installing the new backup master domain manager

Installing a new backup master domain manager

Before you begin



Before starting the installation, ensure the following steps have been completed:

1. [Installing WebSphere Application Server Liberty Base on page 55](#) on the workstation where you plan to install the backup master domain manager
2. [Encrypting passwords \(optional\) on page 235](#)
3. [Upgrading the database schema on page 211](#)
4. [Creating the IBM Workload Scheduler administrative user on page 216](#)

About this task

You can perform a typical installation, as described in the following scenario, or you can customize the installation parameters, as described in [FAQ - master domain manager and backup master domain manager customizations on page 97](#).

For more information about all **serverinst** parameters and default values, see [Master components installation - serverinst script on page 357](#).

The procedure to install the backup master domain manager is exactly the same as installing a master domain manager. The backup master domain manager is installed on a workstation different from the master domain manager and points to its local WebSphere Application Server Liberty Base installation. IBM® Workload Scheduler detects the presence of an existing master domain manager in the environment and proceeds to install a backup master domain manager.

The IBM® Workload Scheduler administrator installs the master domain manager. The following information is required:

Table 21. Required information

Command parameter	Information type	Provided in..
Database information		
--rdbmstype	database type	Upgrading the database schema on page 211
--dbhostname	database hostname	
--dbport	database port	
--dbname	database name	
--dbuser	database user name	
--dbpassword	database password	
IBM® Workload Scheduler information		
--wouser	IBM® Workload Scheduler administrative user name	Creating the IBM Workload Scheduler administrative user on page 91
--wapassord	IBM® Workload Scheduler administrative user password	
WebSphere Application Server Liberty Base information		
--wlpdir	WebSphere Application Server Liberty Base installation directory	Installing WebSphere Application Server Liberty Base on page 55

You can run the **serverinst** command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

Default values are stored in the `serverinst.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `serverinst.properties` file, but do not modify the `serverinst.template` file located in the same path.

To install the backup master domain manager, perform the following steps:

1. Log in as root to the workstation where you plan to install.
2. Browse to the folder where the `serverinst` command is located in `image_location/TWS/interp_name`.
3. Start the installation specifying a typical set of parameters. In this case, default values are used for all remaining parameters:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --rdbmstype <db_type>
--dbhostname <db_hostname> --dbport <db_port> --dbname <db_name>
```

```
--dbuser <db_user> --dbpassword <db_password> --wuser <wa_user>
--wapassword <wa_password> --wlpdir <Liberty_installation_dir>\wlp
```

On UNIX operating systems

```
serverinst.sh --acceptlicense yes --rdbmstype <db_type>
--dbhostname <db_hostname> --dbport <db_port> --dbname <db_name>
--dbuser <db_user> --dbpassword <db_password> --wuser <wa_user>
--wapassword <wa_password> --wlpdir <Liberty_installation_dir>/wlp
```

where

acceptlicense

Specify **yes** to accept the product license.

rdbmstype|-r *rdbms_type*

The database type. Supported databases are:

- DB2
- ORACLE
- IDS (Informix), only for UNIX operating systems
- MSSQL

This parameter is optional. The default value is **db2**.

dbhostname *db_hostname*

The host name or IP address of database server.

dbport *db_port*

The port of the database server.

dbname *db_name*

The name of the IBM® Workload Scheduler database.

dbuser *db_user*

The user that has been granted access to the IBM® Workload Scheduler tables on the database server.

dbpassword *db_password*

The password for the user that has been granted access to the IBM® Workload Scheduler tables on the database server.

wuser *user_name*

The user for which you are installing IBM Workload Scheduler.

wapassword *wuser_password*

The password of the user for which you are installing IBM Workload Scheduler.

On Windows operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_), characters, and ()|?*~+.

On UNIX operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_), characters, and ()|?=*~+.

wlpdir

The path where WebSphere Application Server Liberty Base is installed.

4. To verify that the installation completed successfully, browse to the directory where you installed the backup master domain manager and type the following commands:

```
./twc_env.sh
```

```
optman ls
```

This command lists the IBM® Workload Scheduler configurations settings and confirms that IBM® Workload Scheduler installed correctly.

Results

You have now successfully installed the backup master domain manager and it is inserted in the next production plan. To have the backup domain manager added immediately to the production plan, run

```
JnextPlan -for 0000
```

If you want to customize more installation parameters, see [FAQ - master domain manager and backup master domain manager customizations on page 97](#).

What to do next

You can now proceed to [Completing the security configuration for the new environment on page 224](#).

Completing the security configuration for the new environment

Configuring the security file on the new backup master domain manager.

About this task



To complete the security configuration for the new environment, there are a few tasks to complete that can vary depending on whether you are using the default role-based security model, or the classic security model.

Role-based security model

Grant users access to all of the objects associated to the domain and to folders. For example, to grant full access to all objects in the domain and on all folders, create an Access Control list for the users to which you want to give access

1. Grant users access to all of the objects associated to the domain and to objects in the root (/) folder. For example, to grant full access to all objects in the domain and on all folders, create an Access Control list for the users to which you want to give access:
 - a. From the Dynamic Workload Console, open the **Manage Workload Security** panel and select **Give access to users and groups**.
 - b. Select the group from the drop-down list and then select **FULLCONTROL** in the field **Role**.
 - c. Select **Domain** and assign **ALLOBJECTS**.
 - d. Click **Save and create new**.
 - e. Select the group from the drop-down list and then select **FULLCONTROL** in the field **Role**.
 - f. Select **Folder** and then assign the root by clicking **/**.
 - g. Click **Save**.

Classic security model

If you use the classic security model and have specific security settings in your current environment, these settings must be manually merged with the new settings before you build the final security file to be used in your new environment. The statements you might have to add manually vary depending on your specific security settings.

To manually merge the new settings, complete the following procedure:

1. Log in as *TWS_user* on your upgraded master domain manager and set the IBM Workload Scheduler environment.
2. If you have centralized security enabled, extract the new security file on the master using the command:

```
dumpsec > sec_file
```

where *sec_file* is the text file created by the dumpsec command.

3. Edit the *sec_file*, and insert the following statements in all of the stanzas in the file:

Folder

```
FOLDER    NAME=/    ACCESS=ADD,DELETE,DISPLAY,MODIFY,USE,LIST,UNLOCK, ACL
```

Folder access must be given to scheduling objects and access to the folder in which the workstation is defined must be given for the JOB, SCHEDULE, USEROBJ, RESOURCE, and PARAMETER objects:

```
job        cpu=@    + folder = /    + cpufolder = /    access=@
schedule   cpu=@    + folder = /    + cpufolder = /    access=@
cpu        cpu=@    + folder = /                                access=@
userobj    cpu=@    + cpufolder = /                                access=@
resource   cpu=@    + folder = /    + cpufolder = /    access=@
prompt     + folder = /                                access=@
calendar   + folder = /                                access=@
eventrule  name=@   + folder = /
  access=add,delete,display,modify,list,unlock
parameter  cpu=@    + folder = /    + cpufolder = /    access=@
runcygrp   name=@   + folder = /
  access=add,delete,display,modify,use,list,unlock
```



```

vartable      name=@ + folder = /
              access=add,delete,display,modify,use,list,unlock
wkldappl     name=@ + folder = /
              access=add,delete,display,modify,list,unlock

```

Workload application

```

WKLDAPPL NAME=@ + FOLDER = / ACCESS=ADD,DELETE,DISPLAY,MODIFY,LIST,UNLOCK

```

Run cycle group

```

RUNCYGRP NAME=@ + FOLDER = / ACCESS=ADD,DELETE,DISPLAY,MODIFY,USE,LIST,UNLOCK

```

Centralized agent update

Replace the statement:

```

CPU CPU=@
ACCESS=ADD,CONSOLE,DELETE,DISPLAY,FENCE,LIMIT,LINK,MODIFY,SHUTDOWN,
START,STOP,UNLINK,LIST,UNLOCK,RUN,RESEFTTA

```

with the following statement:

```

CPU CPU=@ + FOLDER = /
ACCESS=ADD,CONSOLE,DELETE,DISPLAY,FENCE,LIMIT,LINK,MODIFY,SHUTDOWN,
START,STOP,UNLINK,LIST,UNLOCK,RUN,RESEFTTA,MANAGE

```

Adding members to workstation class

Following the upgrade, to create or modify workstation classes, you must add USE access to CPU objects that are members, or that will be added as members to a workstation class.

```

CPU CPU=@ + FOLDER = /
ACCESS=ADD,CONSOLE,DELETE,DISPLAY,FENCE,LIMIT,LINK,MODIFY,SHUTDOWN,
START,STOP,UNLINK,LIST,UNLOCK,RUN,RESEFTTA,MANAGE,USE

```

4. Check that the user permissions of the new statements are correct and, if necessary, add the user of your old master domain manager to the security file of the master you just upgraded.
5. Due to new support of the UPN Windows user, if you have Windows domain users that are defined in the logon fields as `domain\username`, insert the escape character `'\'` before the `'\'` character in the `domain\username` value. For example, if you use the `MYDOMAIN\user1` value in the logon field, after the upgrade, in the `Security` file you must update the line in following way:

```

.....
logon=MYDOMAIN\\user1
.....

```

6. Save your changes to the `sec_file`.
7. Build your final security file for your new master domain manager using the `makesec` command:

```

makesec sec_file

```

8. If you have centralized security enabled, distribute the security file.

Run `JnextPlan -for 0000` to distribute the Symphony file to the agents.



Note: Ensure that the `optman cef` option is set to all or only the unfinished job streams are carried forward.

9. Restore the previous setting of the `optman cef` option, if necessary.



Note: When a backup master domain manager is installed and the role-based security is configured, the default security file is used.

To change the security settings on the backup master domain manager, perform one of the following tasks:

- Copy the security file from master domain manager to backup master domain manager.
 - 1. Make the switch manager permanent.
 - 2. Open the Manage roles page in the Dynamic Workload Console.
 - 3. Select a role and click OK, without making any changes. As a result, the security file is updated.

What to do next

You can now proceed to [Making the switch manager permanent on page 228](#).

Uninstalling the old backup master domain manager

Procedure to uninstall the backup master domain manager

About this task



Before uninstalling, verify that the user running the uninstallation process has the following authorization requirements:

Windows™ operating systems

If you set the Windows User Account Control (UAC), your login account must be a member of the Windows™ **Administrators** group or domain administrators with the right, **Act as Part of the Operating System**.

If you set the Windows User Account Control (UAC) on the workstation you must run the installation as **administrator**.

UNIX™ and Linux™ operating systems

root access

To uninstall a backup master domain manager, perform the following steps:

1. To uninstall the backup master domain manager, you must first remove it from the plan. Set the workstation running the backup master domain manager to `ignore`, using either the `composer mod cpu workstation_name>` command or from the Dynamic Workload Console.
2. Run JnextPlan to generate the new production plan so that the backup master domain manager is removed from the plan.
3. Run the uninstall script.

- a. Change directory using the following command:

```
cd TWA_home>/TWS/tws_tools
```

- b. Run the uninstallation process by running the script as follows:

Windows™ operating systems

```
cscript uninstall.vbs --prompt no --wouser user_name>
```

UNIX™ and Linux™ operating systems

```
./uninstall.sh --prompt no --wouser user_name>
```

where, `user_name>` represents the user for which you want to uninstall the backup master domain manager. The procedure runs without prompting the user to confirm the uninstallation.

4. Run JnextPlan to update the plan with the changes.

Upgrading a dynamic domain manager instance or its backup

Install a new dynamic domain manager configured as a backup and link it to your current network. Then switch it to become the new dynamic domain manager.

About this task

This is a parallel upgrade procedure that installs a fresh dynamic domain manager configured as backup. The dynamic domain manager configured as a backup points to your existing IBM® Workload Scheduler database and then later becomes your new dynamic domain manager.



This section describes how to upgrade the dynamic components (dynamic domain manager and its backup). For details about the supported versions from which you can upgrade, see the [IBM Workload Scheduler Release Notes](#).

Installing WebSphere Application Server Liberty Base

WebSphere Application Server Liberty Base is required on all workstations where you plan to install the master components and the Dynamic Workload Console.

Before you begin



Ensure that your system meets the operating system and Java requirements. For more information, see WebSphere Application Server Liberty Base detailed system requirements.

About this task

You can quickly install WebSphere Application Server Liberty Base by extracting an archive file on all supported platforms.

To extract the archive, you can use your own Java Ext or use the Java Ext provided with the IBM® Workload Scheduler image. The provided Java Ext is located in the following path in the image for your operating system:

IMAGE_DIR/TWS/INTERP/Tivoli_Eclipse_INTERP/TWS/JavaExt.

To install WebSphere Application Server Liberty Base, perform the following steps:

1. Download WebSphere Application Server Liberty Base from [Recommended updates for WebSphere Application Server Liberty](#).

Each WebSphere Application Server Liberty Base image is packaged as a jar file named

```
wlp-base-all-fix_pack.jar
```



Note: To update IBM® Workload Scheduler to version 9.5 Fix Pack 6, the minimum required version of WebSphere® Liberty is 22.0.0.3 or later.

2. Install WebSphere Application Server Liberty Base by extracting the archive file to a directory of your choice.

On Windows operating systems

```
java -jar liberty_download_dir\wlp-base-all-fix_pack.jar
--acceptLicense install_dir
```

On UNIX operating systems

```
java -jar liberty_download_dir/wlp-base-all-fix_pack.jar
--acceptLicense install_dir
```

where:

liberty_download_dir

The directory where you downloaded WebSphere Application Server Liberty Base.

install_dir

The directory where you want to install WebSphere Application Server Liberty Base.



Note: Note that the value of the `install_dir` parameter must match the value to be defined for the `wlmdir` parameter when installing the master domain manager and its backup, dynamic domain manager and its backup, and the Dynamic Workload Console.

3. Ensure the IBM® Workload Scheduler administrative user that you created has the rights to run WebSphere Application Server Liberty Base and full access to the installation directory. If WebSphere Application Server Liberty Base is shared between the master domain manager and the Dynamic Workload Console, ensure also the Dynamic Workload Console user has the same rights.

Results

You have now successfully installed WebSphere Application Server Liberty Base.

What to do next

You can now proceed to [Encrypting passwords \(optional\) on page 245](#).

Encrypting passwords (optional)

How to encrypt passwords required by the upgrade process

About this task



Before you start the installation process, you can optionally encrypt the passwords you will use while installing, upgrading, and managing IBM® Workload Scheduler. The encryption mechanism is based on your WebSphere Application Server Liberty Base installation. You can use either the `{xor}` or `{aes}` encoding. For more information, see [Liberty: The limits to protection through password encryption](#).

To encrypt the passwords, proceed as follows:

What to do next

You can now proceed to [Upgrading the database schema for the dynamic domain manager on page 245](#).

Upgrading the database schema for the dynamic domain manager

Upgrade the dynamic domain manager database schema before upgrading the dynamic domain manager component.

About this task





Note: Before upgrading the database schema, ensure you have created a backup. Refer to the documentation related to your RDBMS for information about the backup procedure.

You can perform a typical database upgrade procedure as described in the following scenario, or you can customize the database parameters, as described in [FAQ - Database customizations on page 214](#).

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

You can run the `configureDb` command specifying a typical set of parameters. The script creates an SQL file with all the statements needed to upgrade the IBM® Workload Scheduler database schema to the latest version and, by default, automatically applies it. Default values are stored in the `configureDb.properties` file, located in `image_location/TWS/interp_name`. If you need to modify any of the default values, edit the `configureDb.properties` file, but do not modify the `configureDb.template` file located in the same path.

To upgrade the IBM® Workload Scheduler database schema, perform the following steps:

1. On the workstation where the dynamic domain manager is installed, extract the IBM® Workload Scheduler installation package to a directory of your choice.
2. Browse to the `image_location/TWS/interp_name` path.
3. On the workstation where you will install the new backup dynamic domain manager that will then switch to become the current active dynamic domain manager, type the following command to upgrade the IBM® Workload Scheduler database schema. Ensure that you use the same database administrator credentials you used when the IBM® Workload Scheduler database schema objects were created.

DB2

On Windows operating systems

```
cscript configureDb.vbs --componenttype DDM --rdbmstype DB2
--dbhostname db_hostname --dbport db_port
--dbname db_name --dbuser db_user --dbpassword db_password
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
--iwsname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
```

On UNIX operating systems

```
./configureDb.sh --componenttype DDM --rdbmstype DB2 --dbhostname db_hostname
--dbport db_port
--dbname db_name --dbuser db_user --dbpassword db_password
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
--iwsname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
```

Oracle

On Windows operating systems

```
cscript configureDb.vbs --componenttype DDM --rdbmstype ORACLE
--dbname service_name
--dbuser db_user --dbpassword db_password --dbhostname db_hostname
```

```
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
--iwsname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
```

On UNIX operating systems

```
./configureDb.sh --componenttype DDM --rdmstype ORACLE --dbname service_name
--dbuser db_user --dbpassword db_password --dbhostname db_hostname
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
--iwsname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
```

Informix

On UNIX operating systems

```
./configureDb.sh --componenttype DDM --rdmstype IDS --dbname db_name
--dbuser db_user
--dbpassword db_password --dbhostname db_hostname --dbadminuser db_administrator
--dbadminuserpw db_administrator_password
--iwsname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
```

MSSQL

On Windows operating systems

```
cscript configureDb.vbs --componenttype DDM --rdmstype MSSQL
--dbhostname db_hostname --dbport db_port
--dbname db_name --dbuser db_user --dbpassword db_password
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
--iwsname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
--auth_type SQLSERVER
```

On UNIX operating systems

```
./configureDb.sh --componenttype DDM --rdmstype MSSQL --dbhostname db_hostname
--dbport db_port
--dbname db_name --dbuser db_user --dbpassword db_password
--dbadminuser db_administrator --dbadminuserpw db_administrator_password
--iwsname tablespace_data --iwslogtsname tablespace_log
--iwsplantsname tablespace_plan
--auth_type SQLSERVER
```

where:

--componenttype

The IBM® Workload Scheduler component for which the database is upgraded. When upgrading a dynamic domain manager, specify **DDM**.

--rdmstype

The database vendor.

--dbhostname *db_hostname*

The host name or IP address of database server.

--dbport *db_port*

The port of the database server.

--dbname *db_name*

The name of the IBM® Workload Scheduler database.

--dbuser *db_user*

The user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--dbpassword *db_password*

The password for the user that has been granted access to the IBM® Workload Scheduler tables on the database server.

--dbadminuser *db_admin_user*

The database administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--dbadminuserpw *db_admin_password*

The password of the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server.

--iwststname *tablespace_data*

The name of the tablespace for IBM® Workload Scheduler data. The default value for all supported RDBMS is TWS_DATA, with the exception of Oracle where the default is USERS.

--iwslogstname *tablespace_log*

The name of the tablespace for the IBM® Workload Scheduler log. The default value for all supported RDBMS is TWS_LOG, with the exception of Oracle where the default is USERS.

--iwsplantsname *db_port*

The name of the tablespace for the IBM® Workload Scheduler plan. The default value for all supported RDBMS is TWS_PLAN, with the exception of Oracle where the default is USERS.

--auth_type *db_name*

The MSSQL authentication mode. The default is SQLSERVER which uses native SQL authentication.



Note: The following parameters specified with the configureDb command are also required when you upgrade the dynamic domain manager with the serverinst command and their values must be the same:

- **rdbmstype**
- **dbhostname**
- **dbport**
- **dbname**



- **dbuser**
- **dbpassword**

Results

You have now successfully upgraded the database for the dynamic domain manager.

What to do next

You can now proceed to [Creating the IBM Workload Scheduler administrative user on page 249](#).

Creating the IBM® Workload Scheduler administrative user

Instructions to create the IBM® Workload Scheduler administrative user



IBM® Workload Scheduler administrative user

The IBM® Workload Scheduler administrator creates the administrative user (**wauser**). The administrative user is the user for which the product will be installed in the subsequent steps. This implies that this user has full access to all scheduling objects.

The user name can contain alphanumeric, dash (-), and underscore (_) characters; it cannot contain national characters. The first character of the user name must be a letter.

The following considerations apply:

On Windows operating systems:

- If this user account does not already exist, it is automatically created at installation time.
- If installing on a Windows™ server in a domain, do not define a domain and local ID with the same user name.
- If you specify a domain user, define the name as *domain_name\user_name*.
- If you specify a local user, define the name as *system_name\user_name*. Type and confirm the password.

On UNIX and Linux operating systems:

This user account must be created manually before running the installation and must be enabled to login to the machine where the master domain manager is going to be installed. Create a user with a home directory and group. Use the appropriate UNIX and Linux operating system commands to create the user.

For more information, see [IBM Workload Scheduler user management on page 50](#).

What to do next

You can now proceed to [Installing a new backup dynamic domain manager on page 250](#).

Installing a new backup dynamic domain manager

Procedure for installing the new backup dynamic domain manager



Install a new dynamic domain manager at the latest product version level configured as the new backup dynamic domain manager by running the serverinst script.

The procedure to install the dynamic domain manager and backup dynamic domain manager is exactly the same, with the difference that it is performed on two different workstations and that each installation points to its local WebSphere Application Server Liberty Base installation. IBM® Workload Scheduler determines whether or not a dynamic domain manager is already present in the environment and proceeds to install a dynamic domain manager or backup dynamic domain manager accordingly.

The IBM® Workload Scheduler administrator installs the dynamic domain manager as the backup. The following information is required:

Table 22. Required information

Command parameter	Information type	Provided in...
Database information		
--rdbmstype	database type	Upgrading the database schema for the dynamic domain manager on page 245
--dbhostname	database hostname	
--dbport	database port	
--dbname	database name	
--dbuser	database user name	
--dbpassword	database password	
IBM® Workload Scheduler information		
--wuser	IBM® Workload Scheduler administrative user name	Creating the IBM Workload Scheduler administrative user on page 249
--wapassord	IBM® Workload Scheduler administrative user password	

Table 22. Required information

(continued)

WebSphere Application Server Liberty Base information		
<code>--wlpdir</code>	WebSphere Application Server Liberty Base installation directory	Installing WebSphere Application Server Liberty Base on page 243

Before starting the installation, ensure the following steps have been completed:

1. [Installing WebSphere Application Server Liberty Base on page 243](#) on the workstation where you plan to install the dynamic domain manager and on the workstation where you plan to install the backup dynamic domain manager
2. [Encrypting passwords \(optional\) on page 245](#)
3. [Upgrading the database schema for the dynamic domain manager on page 245](#)
4. [Creating the IBM Workload Scheduler administrative user on page 249](#)
5. **Distribute the Symphony file to the new dynamic domain manager configured as backup:**
 - a. Ensure that the `optman cf` option is set to `all`.
 - b. To distribute the Symphony file to the new dynamic domain manager configured as backup, run `JnextPlan -for 0000` or wait until the end of the production plan.
 - c. Restore the previous setting of the `optman cf` option, if you previously modified the value.

You can run the `serverinst` command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

Default values are stored in the `serverinst.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `serverinst.properties` file, but do not modify the `serverinst.template` file located in the same path.

To install the dynamic domain manager as a backup, perform the following steps:

1. Log in to the workstation where you plan to install as root.
2. Browse to the folder where the `serverinst` command is located:

On Windows operating systems

`image_location\TWS\interp_name`

On UNIX operating systems

`image_location/TWS/interp_name`

3. Start the installation specifying a typical set of parameters. In this case, default values are used for all remaining parameters:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --rdbmstype db_type
--dbhostname db_hostname --dbport db_port --dbname db_name
--dbuser db_user --dbpassword db_password --wauser wa_user
--wapassword wa_password --componenttype DDM --domain domain_name
--master mdm_name --mdmbrokerhostname mdm_broker_host_name
--mdmhttpsport mdm_https_host_name --wlpdir Liberty_installation_dir\wlp
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --rdbmstype db_type
--dbhostname db_hostname --dbport db_port --dbname db_name
--dbuser db_user --dbpassword db_password --wauser wa_user
--wapassword wa_password --componenttype DDM --domain domain_name
--master mdm_name --mdmbrokerhostname mdm_broker_host_name
--mdmhttpsport mdm_https_host_name --wlpdir Liberty_installation_dir/wlp
```

You have now successfully installed the backup dynamic domain manager at the new product version level.

For more information about all **serverinst** parameters and default values, see [Master components installation - serverinst script on page 357](#).

What to do next

You can now proceed to [Switching the dynamic domain manager to the new or upgraded dynamic domain manager configured as backup on page 252](#).

Switching the dynamic domain manager to the new or upgraded dynamic domain manager configured as backup

Switch the old dynamic domain manager to become a backup dynamic domain manager. As a result, the backup dynamic domain manager you installed in the previous step, becomes the current dynamic domain manager.

About this task



Switch to your new dynamic domain manager configured as backup, so that it becomes your current dynamic domain manager, by completing the following steps:

1. Stop the workload broker server on the dynamic domain manager at the previous product version level, by running the following command:

On Windows operating systems

```
stopBrokerApplication.bat
-user username -password password
[-port portnumber]
```

On UNIX and Linux operating systems

```
stopBrokerApplication.sh
-user username -password password
[-port portnumber]
```

where *username* and *password* are the values specified during the dynamic domain manager installation. The parameter *portnumber* is optional, if it is not specified, the default is used.

2. Switch the dynamic domain manager to its backup workstation. Use either the Dynamic Workload Console or run the command:

```
conman
switchmgr dyn_dom;new_mgr_cpu
```

where *dyn_dom* is the domain where you installed the backup dynamic domain manager and the *new_mgr_cpu* is the backup dynamic domain manager workstation name.

3. From the new current dynamic domain manager, unlink the old dynamic domain manager workstation:

```
conman "unlink old_ddm_wks"
```

where *old_ddm_wks* is the old dynamic domain manager workstation name at the previous product version that now has the backup role.

For more detailed information about switching a domain manager, see the complete procedure for switching a domain manager in *Administration Guide*.

What to do next

You can now proceed to install a new dynamic domain manager configured as a backup at the latest production version. as described in [Installing a new backup dynamic domain manager on page 253](#)

Installing a new backup dynamic domain manager

Procedure for installing the new backup dynamic domain manager



At this phase in the procedure, you have installed a fresh backup dynamic domain manager at the latest product version level and switched it to become the new dynamic domain manager. To complete the environment set up, you now need to install a new backup dynamic domain manager at the latest product version level by running the `serverinst` script.

The procedure to install the dynamic domain manager and backup dynamic domain manager is exactly the same, with the difference that it is performed on two different workstations and that each installation points to its local WebSphere Application Server Liberty Base installation. IBM® Workload Scheduler determines whether or not a dynamic domain manager is already present in the environment and proceeds to install a dynamic domain manager or backup dynamic domain manager accordingly.

The IBM® Workload Scheduler administrator installs the dynamic domain manager as the backup. The following information is required:

Table 23. Required information

Command parameter	Information type	Provided in...
Database information		
--rdbmstype	database type	Upgrading the database schema for the dynamic domain manager on page 245
--dbhostname	database hostname	
--dbport	database port	
--dbname	database name	
--dbuser	database user name	
--dbpassword	database password	
IBM® Workload Scheduler information		
--wouser	IBM® Workload Scheduler administrative user name	Creating the IBM Workload Scheduler administrative user on page 249
--wapassword	IBM® Workload Scheduler administrative user password	
WebSphere Application Server Liberty Base information		
--wlpdir	WebSphere Application Server Liberty Base installation directory	Installing WebSphere Application Server Liberty Base on page 243

Before starting the installation, ensure the following steps have been completed:

1. [Installing WebSphere Application Server Liberty Base on page 243](#) on the workstation where you plan to install the dynamic domain manager and on the workstation where you plan to install the backup dynamic domain manager
2. [Encrypting passwords \(optional\) on page 245](#)
3. [Upgrading the database schema for the dynamic domain manager on page 245](#)
4. [Creating the IBM Workload Scheduler administrative user on page 249](#)
5. **Distribute the Symphony file to the new dynamic domain manager configured as backup:**
 - a. Ensure that the **optman cf** option is set to *all*.
 - b. To distribute the Symphony file to the new dynamic domain manager configured as backup, run `JnextPlan -for 0000` or wait until the end of the production plan.
 - c. Restore the previous setting of the **optman cf** option, if you previously modified the value.

You can run the **serverinst** command specifying a typical set of parameters. In this case, default values are used for all remaining parameters.

Default values are stored in the `serverinst.properties` file, located in `image_location/TWS/interp_name`.

If you need to modify any of the default values, edit the `serverinst.properties` file, but do not modify the `serverinst.template` file located in the same path.

To install the dynamic domain manager as a backup, perform the following steps:

1. Log in to the workstation where you plan to install as root.
2. Browse to the folder where the `serverinst` command is located:

On Windows operating systems

```
image_location\TWS\interp_name
```

On UNIX operating systems

```
image_location/TWS/interp_name
```

3. . Start the installation specifying a typical set of parameters. In this case, default values are used for all remaining parameters:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --rdbmstype db_type
--dbhostname db_hostname --dbport db_port --dbname db_name
--dbuser db_user --dbpassword db_password --wouser wa_user
--wapassword wa_password --componenttype DDM --domain domain_name
--master mdm_name --mdmbrokerhostname mdm_broker_host_name
--mdmhttpsport mdm_https_host_name --wlpdir Liberty_installation_dir\wlp
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --rdbmstype db_type
--dbhostname db_hostname --dbport db_port --dbname db_name
--dbuser db_user --dbpassword db_password --wouser wa_user
--wapassword wa_password --componenttype DDM --domain domain_name
--master mdm_name --mdmbrokerhostname mdm_broker_host_name
--mdmhttpsport mdm_https_host_name --wlpdir Liberty_installation_dir/wlp
```

You have now successfully installed the backup dynamic domain manager at the new product version level.

For more information about all `serverinst` parameters and default values, see [Master components installation - serverinst script on page 357](#).

What to do next

You can now optionally proceed to [Switching back to the old dynamic domain manager \(optional\) on page 255](#).

Switching back to the old dynamic domain manager (optional)

Optionally switch back to the old dynamic domain manager

About this task



This step is optional. You can switch back to your old dynamic domain manager.

From the old dynamic domain manager, run the command:

```
conman
switchmgr dyn_dom;old_mgr_cpu
```

where *dyn_dom* is the domain where the dynamic domain manager configured as backup is installed and the *old_mgr_cpu* is the old dynamic domain manager workstation name

Upgrading agents

There are several methods you can choose from to upgrade your agents.

The agent upgrade can be performed with minimal impact to scheduling activities. The agents are stopped for the shortest time necessary to perform the maintenance. Any active agent command-line interfaces and processes, such as conman, composer, netman, mailman, and batchman, to name a few, continue running. Any jobs already running when the upgrade process begins, continue to run as planned, however, no new jobs begin execution during this time. Once the upgrade is complete, the agent is restarted and quickly reconnects with its jobs. Any jobs that were actively running before the upgrade that have not yet completed, continue to run, and any jobs that successfully finished running during the upgrade procedure report a successful job status. An automatic backup and restore feature is in place in case of failure.

If you choose to upgrade your environment top-down, then the agents get upgraded progressively after you have upgraded the master domain manager and its backup. This means that new features and enhancements are not available on all of your agents at the same time. If, instead, you choose to upgrade your environment bottom-up, then the agents are upgraded first, and new features and enhancements become available after the master domain manager and its backup have been upgraded.

! **Important:** After upgrading your fault-tolerant agents, it might be necessary to manually update the security file on the fault-tolerant agents in your environment to add access to folders for all of the scheduling objects that can be defined or moved into folders. These updates are especially important if you plan to use the command line on the fault-tolerant agents to perform operations on the objects in folders. See the topic about updating the security file in the *Administration Guide* for more information.

You can choose to upgrade your agents using any of the following methods:

twinsinst script

A single line command that checks if processes or a command line is running before it starts. It saves disk space and RAM because it is not Java-based. See [Upgrading agents and domain managers with twinsinst on page 257](#) and [Upgrading agents on IBM i systems on page 263](#)

Centralized agent update

Upgrade or update multiple fault-tolerant agent and dynamic agent instances at the same time. Download the fix pack installation package, or the elmage upgrade package to the master domain manager and then either run the installation on multiple agent instances or schedule the installation by creating and submitting a job to run. This upgrade method is not supported on z-centric agent instances. See [Centralized agent update on page 270](#).

HCL BigFix

Upgrade IBM® Workload Scheduler agents using HCL BigFix analyses and fixlets. You can choose to schedule the upgrade or you can run it immediately. See [Upgrading agents using HCL BigFix on page 280](#).

For a list of supported operating systems and requirements, see the System Requirements Document at [IBM Workload Scheduler Detailed System Requirements](#).

When the upgrade procedure has completed successfully, the backup instance is deleted.



Note: The `localopts` file is not modified during the agent upgrade process. The file generated by the upgrade process is saved to the `/config` directory to maintain your custom values, if any. You can then merge the two files with your customized values and save the resulting file in the following path:

On Windows operating systems

```
<TWA_home>\TWS
```

On UNIX operating systems

```
<TWA_DATA_DIR>
```

Upgrading agents and domain managers with twsinst

How to upgrade IBM Workload Scheduler agents and domain managers in your distributed, z/OS®, or end-to-end network.

The upgrade of agents and domain managers is supported starting from V9.3. The agent upgrade process meets the following objectives:

Performs the upgrade in a safe way

It checks for any processes or command lines that are running before starting. It stops them only for the short time necessary to perform the upgrade. If the upgrade fails, a backup and restore feature is in place.

Saves time, disk space, and RAM when upgrading the product

It performs the agent upgrade in less time than traditional methods. It saves disk space and RAM because it is not Java-based.

Uses a very simple command

It consists of a single line command.

Manages both Windows™ and UNIX™ operating system workstations

It runs on both Windows™ and UNIX™ agents.

Use the **twinsinst** script to upgrade the IBM Workload Scheduler agent in your distributed or end-to-end network.

For information about upgrading agents, see [Procedure on page 258](#). See [Agent installation parameters - twinsinst script on page 108](#) for a full description of the agent installation parameters used by the script.

Procedure

Before you begin

1. Verify that the user running the installation process has the following authorization requirements:

Windows™ operating systems

If you set the Windows User Account Control (UAC), your login account must be a member of the Windows™ **Administrators** group or domain administrators with the rights **Act as Part of the Operating System**.

You must run the installation as **administrator**.

UNIX™ and Linux™ operating systems

You must have **root** access.

2. Ensure that you downloaded the IBM Workload Scheduler agent elmage (for details, see the Download Document at [IBM Workload Scheduler download document](#)).
3. Ensure that you have enough temporary space before starting the installation process.

About this task

To upgrade agents, from the directory that contains the IBM Workload Scheduler agent elmage, run the **twinsinst** script using the synopsis described below.

twinsinst for Windows™ is a Visual Basic Script (VBS) that you can run in CScript and WScript mode, for example:

```
cscript twinsinst.vbs -update -uname username -acceptlicense yes
```

A successful upgrade using the **twinsinst** script issues the return code RC = 0. If the upgrade fails, to understand the cause of the error see [Synopsis on page 258](#).

Synopsis:

Windows™ operating systems

Upgrade an instance

```

cscript twsinst.vbs -update -uname user_name

-acceptlicense yes|no
[-addjruntime true]
[-inst_dir install_dir [-recovInstReg true]]
[-lang lang_id]
[-patch]
[-skipbackup]
[-skipcheckprereq]
[-skip_usercheck]
[-wait minutes]
[-work_dir working_dir]

```

UNIX™ and Linux™ operating systems

Show command usage and version

```
./twsinst -u | -v
```

Upgrade an instance

```

./twsinst -update [-uname user_name]
-acceptlicense yes|no
[-addjruntime true]
[-create_link]
[-inst_dir install_dir [-recovInstReg true]]
[-lang lang-id]
[-reset_perm]
[-patch]
[-skipbackup]
[-skipcheckprereq]
[-skip_usercheck]
[-wait minutes]
[-work_dir working_dir]

```

-acceptlicense yes/no

Specify whether or not to accept the License Agreement.

-addjruntime true

Adds the Java™ run time to run job types with advanced options to the agent. The run time environment is used to run application job plug-ins on the agent and to enable the capability to run remotely, from the agent, the dynamic workload broker resource command on the server.

This option is applicable to both fault-tolerant agents and dynamic agents.

By default, if the Java run time was already installed on the agent, it is upgraded.

If the Java run time was not installed on the agent, it is not installed during the upgrade, unless you specify

`-addjruntime true`.

If you decided not to install the Java™ run time when you upgrade, you can add this feature later, as described in "Part 2. IBM Workload Scheduler -> Chapter 7. Configuring -> Adding a feature" in *Planning and Installation Guide*.

-create_link

UNIX™ operating systems only. Create the **symlink** between `/usr/bin/at` and `install_dir/TWS/bin/at`. For more information, see [Table 2: Symbolic link options on page 36](#).

-inst_dir install_dir

The directory where you installed IBM Workload Scheduler. When upgrading, the directory **inst_dir** is used whether:

- The upgrade process cannot retrieve the product install location from the registries.
- You need to create the IBM Workload Scheduler registries again before upgrading. See [Re-creating registry files using twsinst on page 288](#) for details.

If you do not provide the **inst_dir** directory and IBM Workload Scheduler cannot retrieve it from the installation registries, the product is installed in the user home directory.

On Windows™ operating systems:

If you specify a path that contains blanks, enclose it in double quotation marks. If not specified, the path is set to `%ProgramFiles%\IBM\TWA`.

On UNIX™ and Linux™ operating systems:

The path cannot contain blanks. If not specified, the path is set to the `user_name` home directory.

-lang

The language in which the `twsinst` messages are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used.



Note: The **-lang** option does not relate to the supported language packs. By default, all supported language packs are installed when you install using the `twsinst` script.

-password

Windows system only. The password of the user for which you are installing IBM Workload Scheduler. The password is not required for the upgrade procedure.

-recovInstReg true

To re-create the registry files. Specify if you tried to upgrade a stand-alone, fault-tolerant agent (an agent that is not shared with other components or does not have the connector feature) and you received an error message that states that an instance of IBM Workload Scheduler cannot be found. This error can be caused by a corrupt registry file. See [Upgrading when there are corrupt registry files on page 288](#). If you specify this parameter you must set **-inst_dir** option.

-reset_perm

UNIX™ systems only. Reset the permissions of the `libatrc` library.

-skipcheckprereq

If you specify this parameter, IBM Workload Scheduler does not scan system prerequisites before installing the agent. For more information on the prerequisite check, see [Scanning system prerequisites for IBM Workload Scheduler on page 52](#).

- patch

Specifies that a patch must be installed. When you specify this option, only the files present in the patch package are replaced in the installed product and all other product files remain unchanged.

-skipbackup

If you specify this parameter the upgrade process does not create a backup of the instance you are upgrading. If the agent upgrade fails, the agent cannot be restored. If you do not specify this parameter, the upgrade process creates a backup of the agent instance in the path `work_dir>/backup`. The `work_dir>` is a temporary directory used by the upgrade process. It can be defined by passing the parameter `-work_dir` to the `twinst` script. If you do not define the `work_dir` then by default it is set to `/tmp/TWA_${INST_USER}/tws94`, where `tmp` is the temporary directory of the operating system and `${INST_USER}` is the user performing the upgrade. For example, `/tmp/TWA_jsmith/tws94/backup`.

-skip_usercheck

Enable this option if the authentication process within your organization is not standard, thereby disabling the default authentication option. On UNIX™ and Linux™ operating systems if you specify this parameter, the program skips the check of the user in the `/etc/passwd` file or the check you perform using the `su` command. On Windows™ operating systems if you specify this parameter, the program does not create the user you specified in the `-uname username` parameter. If you specify this parameter you must create the user manually before running the script.

-uname username

The name of the user for which IBM Workload Scheduler is being updated. The software is updated in this user's home directory. This user name is not to be confused with the user performing the upgrade.

-update

Upgrades an existing agent that was installed using the `twinst` script.

-wait minutes

The number of minutes that the product waits for jobs that are running to complete before starting the upgrade. If the jobs do not complete during this interval the upgrade does not proceed and an error message is displayed. Valid values are integers or `-1` for the product to wait indefinitely. The default is `60`.

-work_dir working_dir

The temporary directory used for the IBM Workload Scheduler upgrade process files deployment.

On Windows™ operating systems:

If you specify a path that contains blanks, enclose it in double quotation marks. If you do not manually specify a path, the path is set to `%temp%\TWA\twsversion_number>`, where `%temp%` is the temporary directory of the operating system.

On UNIX™ and Linux™ operating systems:

The path cannot contain blanks. If you do not manually specify a path, the path is set to `/tmp/TWA/twsversion_number>`.

What to do next

When the agent upgrade completes, the agent is restarted and quickly reconnects with its jobs. Any jobs that were actively running before the upgrade that have not yet completed, continue to run, and any jobs that successfully finished running during the upgrade procedure report a successful job status. An automatic backup and restore feature is in place in case of failure.

Examples

About this task

This section contains examples of **twsinst** scripts that you can use to upgrade an agent.

To upgrade an agent installed in the user home directory that does not have the dynamic scheduling capabilities and the Java™ run time to run job types with advanced options:

```
./twsinst -update -uname twsuser -acceptlicense yes
```

To upgrade an agent installed in the path `/opt/IBM/TWA` on UNIX operating systems and in the path `C:\Program Files\IBM\TWA` on Windows operating systems, and give it dynamic scheduling capabilities, but not the Java™ run time to run job types with advanced options:

On Windows™ operating systems:

```
cscript twsinst -update -uname TWS_user -password password
-acceptlicense yes
-tdwbhostname mybroker.mycompany.com -tdwbport 31116
-inst_dir "c:\Program Files\IBM\TWA"
```

On UNIX™ and Linux™ operating systems:

```
./twsinst -update -uname twsuser
-acceptlicense yes
-tdwbhostname mybroker.mycompany.com
-tdwbport 31116 -inst_dir /opt/IBM/TWA
```

To upgrade an agent and give it both dynamic scheduling capabilities and the Java™ run time to run job types with advanced options. The run time environment is used to run application job plug-ins on the agent and to enable the capability to remotely run, from the agent, the dynamic workload broker resource command on the server:

On Windows™ operating systems:

```
cscript twsinst -update -uname TWS_user -password password
-acceptlicense yes
-tdwbhostname mybroker.mycompany.com -tdwbport 31116 -addjruntime true
-inst_dir "c:\Program Files\IBM\TWA"
```

On UNIX™ and Linux™ operating systems:

```
./twsinst -update -uname twsuser -acceptlicense yes
-tdwbhostname mybroker.mycompany.com
-tdwbport 31116 -addruntime true
```

Upgrading agents on IBM i systems

How to upgrade agents on IBM i systems.

About this task

You can upgrade the agent on an IBM i system by using the `twsinst` installation script.

To upgrade an IBM Workload Scheduler agent, perform the following steps:

1. Sign on as **QSECOFR** user.
2. Download the agent elmage from the [IBM Passport Advantage](#). For more information about the installation media, see [Downloading installation images on your workstation on page 201](#) or the Download Document at [IBM Workload Scheduler download document](#).
3. If you downloaded the elimages, to extract the package, use the *PASE* shell or the *AIXterm* command.

Using PASE shell:

- a. Open the *PASE* shell.
- b. Run the command "CALL QP2TERM".
- c. Locate the folder where you downloaded the elimages and run the command:

```
"tar xvf TWS95_IBM_I.tar"
```

- d. Exit from the *PASE* shell.

Using AIXterm command:

- a. Start the *Xserver* on your desktop.
- b. On the iSeries machine, open a *QSH shell* and export the display.
- c. In *QSH shell*, go to the directory `/QopenSys` and run the command "aixterm -sb".
- d. A pop-up window is displayed on your desktop. By Using this pop-up window, extract the file `TWS95_IBM_I.tar`.

4. Open a *QSH shell* and run the `twsinst` script.

The installation procedure replaces the library to the user profile library list of the dynamic agent user profile and sets this job description as the job description of the dynamic agent user profile. The upgrade process replaces the new version of the agent in the directory where the old agent is installed.



Note: If you do not run the `twsinst` script from a *QSH shell* the installation fails.

If the operation fails to understand the cause of the error, see [Analyzing return codes for agent installation, upgrade, restore, and uninstallation on page 145](#).

Command usage and version

Show command usage and version

```
twinst -u | -v
```

Upgrade an instance

```
./twinst -update -uname user_name
-acceptlicense yes|no
[-addjruntime true]
[-create_link]
[-hostname host_name]
[-inst_dir install_dir]
[-jport port_number]
[-jportssl boolean]
[-lang lang-id]

[-reset_perm]
[-recovInstReg true]
[-skip_usercheck]
[-tdwbhostname host_name]
[-tdwbport port_number]
[-wait minutes]
[-work_dir working_dir]
```

For a description of the installation parameters and options that are related to agent on this operating system, see [Agent upgrade parameters on IBM i systems on page 264](#).

Agent upgrade parameters on IBM i systems

About this task

The parameters set when using the **twinst** script to upgrade a dynamic agent on IBM i systems.

-acceptlicense yes/no

Specify whether to accept the License Agreement.

-addjruntime true

Adds the Java™ run time to run job types with advanced options to the agent. The run time environment is used to run application job plug-ins on the agent and to enable the capability to run remotely, from the agent, the dynamic workload broker resource command on the server.

By default, if the Java run time was already installed on the agent, it will be upgraded to the new version.

If the Java run time was not installed on the agent, it will not be installed during the upgrade, unless you specify

```
-addjruntime true.
```

If you decided not to install Java™ run time when you upgrade, you can still add this feature later. For details about how to add a feature, see *IBM® Z Workload Scheduler: Planning and installation*.

-create_link

Create the **symlink** between `/usr/bin/at` and `<install_dir>/TWS/bin/at`. See [Table 2: Symbolic link options on page 36](#) for more information.

-displayname

The name to assign to the agent. The default is the host name of this computer.

-inst_dir *installation_dir*

The directory of the IBM Workload Scheduler installation.



Note: The path cannot contain blanks. If you do not manually specify a path, the path is set to the default home directory, that is, the `user_home/user_name` directory.

-jimport *port_number*

The JobManager port number used by the dynamic workload broker to connect to the IBM Workload Scheduler dynamic agent. The default value is **31114**. The valid range is from 1 to 65535.

-jimportssl *true/false*

The JobManager port used by the dynamic workload broker to connect to the IBM Workload Scheduler dynamic agent. This number is registered in the `ita.ini` file located in the `ITA/cpa/ita` directory.

For communication using SSL or HTTPS

Set **jimportssl = true**. To communicate with the dynamic workload broker, it is recommended that you set the value to **true**. If the value is set to **true**, the port specified in **jimport** communicates in HTTPS.

For communication without using SSL, or through HTTP

Set **jimportssl = false**. If the value is set to **false**, the port specified in **jimport** communicates in HTTP.

-lang *lang_id*

The language in which the `twsinst` messages are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used.



Note: This is the language in which the installation log is recorded, and not the language of the installed engine instance. The `twsinst` script installs all languages by default.

-recovInstReg *true*

To re-create the registry files. Specify it if you have tried to upgrade a stand-alone, fault-tolerant agent (an agent that is not shared with other components or does not have the connector feature) and you received an error message that states that an instance of IBM Workload Scheduler cannot be found, this can be caused by a corrupt registry file. See [Upgrading when there are corrupt registry files on page 288](#).

-skip_usercheck

Enable this option if the authentication process within your organization is not standard, thereby disabling the default authentication option. If you specify this parameter, you must create the user manually before running the script.

-skipcheckprereq

If you specify this parameter, IBM Workload Scheduler does not scan system prerequisites before upgrading the agent.

For a detailed list of supported operating systems and product prerequisites, see [IBM Workload Scheduler Detailed System Requirements](#).

-tdwbhostname *host_name*

The dynamic workload broker fully qualified host name. It is used together with the **-tdwbport** *tdwbport_number* parameter. It adds and starts the capabilities to run workload dynamically to IBM Workload Scheduler. If not specified you cannot run your workload dynamically and this parameter assumes the **localhost** default value. This value is registered in the **ResourceAdvisorUrl** property in the `JobManager.ini` file.

-tdwbport *tdwbport_number*

The dynamic workload broker HTTP or HTTPS port number used to add dynamic scheduling capabilities to your distributed or end-to-end environment. It is used together with the **-tdwbhostname** *host_name* parameter. This number is registered in the `ResourceAdvisorUrl` property in the `JobManager.ini` file. The default value is **0**, however, if you leave the value as **0**, you cannot run your workload dynamically. Specify a nonzero value to add dynamic capability. The valid range is 0 to 65535.

-uname *user_name*

The name of the user for which IBM Workload Scheduler is being updated. The software is updated in this user's home directory. This user name is not to be confused with the user performing the upgrade.



Note: This user name is not the same as the user performing the installation logged on as **QSECOFR**.

-update

Upgrades an existing agent that was installed using **twinst**.

-wait *minutes*

The number of minutes that the product waits for jobs that are running to complete before starting the upgrade. If the jobs do not complete during this interval the upgrade does not proceed and an error message is displayed. Valid values are integers or **-1** for the product to wait indefinitely. The default is **60** minutes.

-work_dir *working_dir*

The temporary directory used for the IBM Workload Scheduler installation process files deployment. The path cannot contain blanks. If you do not manually specify a path, the path is set to `/tmp/TWA/tws95`.

Example upgrade of an agent on IBM i systems

About this task

The following example shows the syntax used when using the **twsinst** script to upgrade an instance of the agent on IBM i system.

```
./twsinst -update
-uname TWS_user
-acceptlicense yes
-nobackup
-work_dir "/tmp/TWA/tws95"
```

The twsinst script log files on IBM i systems

About this task

The twsinst log file name is:

```
<TWS_INST_DIR>/twsinst_IBM_i_TWS_user^product_version.log
```

Where:

TWS_INST_DIR

The IBM Workload Scheduler installation directory. The default installation directory is `/home/TWS_user`.

TWS_user

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

product_version

Represents the product version. For example, for version 9.5 of the product, the value is 9.5.0.00

Analyzing return codes for agent installation, upgrade, restore, and uninstallation

Check how your operation completed by analyzing the return codes that are issued by twsinst.

Return codes that you can receive when you are installing, upgrading, restoring, or uninstalling agents. To analyze them and take corrective actions, run the following steps:

On Windows operating systems

1. Display the operation completion return code, by using the following command:

```
echo %ERRORLEVEL%
```

2. Analyze the following table to verify how the operation completed:

Table 24. Windows operating system agent return codes

Error Code	Description	User action
0	Success: The operation completed successfully without any warnings or errors.	None.
1	Generic failure	<p>Check the messages that are displayed on the screen by the script. Correct the error and rerun the operation.</p> <p>If the error persists, search the https://www.ibm.com/support/home/ database for a solution.</p>
2	The installation cannot create the IBM Workload Scheduler user or assign the correct permission to it.	<p>Verify the operating system policies and configuration. Verify the input values. If necessary, create the user manually before you run the installation.</p>
3	The password is not correct or the installation cannot verify it.	Verify the operating system policies and configuration. Verify the input values.
4	The IBM Workload Scheduler installation directory is not empty. You specified as installation folder a directory that exists.	Empty it or specify a different directory.
5	An error occurred checking the IBM Workload Scheduler prerequisites on the workstation.	See the System Requirements Document at IBM Workload Scheduler Detailed System Requirements .
6	The IBM Workload Scheduler registry is corrupted.	Use the <code>recovInstReg</code> option to recover the registry. Then, rerun the operation.
7	The upgrade or restore operation cannot retrieve the information from the configuration files.	Check that the previous installation and the <code>localopts</code> , the <code>globalopts</code> , the <code>ita.ini</code> , and the <code>JobManager.ini</code> files are not corrupted. Correct the errors and try again the operation.
8	The upgrade, restore, or uninstallation cannot proceed because there are jobs that are running.	Stop the jobs that are running or wait for these jobs to complete. Restart the operation.
9	The upgrade, restore, or uninstallation cannot proceed because there are files that are locked.	Stop all the processes that are running and close all the activities that can

Error Code	Description	User action
		block the installation path. Restart the operation.
10	The upgrade, restore, or uninstallation cannot proceed because there are command lines opened.	Close the command lines. Restart the operation.

On UNIX and Linux operating systems:

1. Display the installation completion return code, by using the following command:

```
echo $?
```

2. Analyze the following table to verify how the installation completed:

Table 25. UNIX or Linux operating system agent return codes

Error Code	Description	User action
0	Success: The installation completed successfully without any warnings or errors.	None.
1	Generic failure.	Check the messages that are displayed on the video by the script. Correct the error and rerun the operation. If the error persists, search the https://www.ibm.com/support/home/ database for a solution.
2	The installation did not find the IBM Workload Scheduler user or its home directory. The IBM Workload Scheduler user that you specified either does not exist or does not have an associated home directory.	Verify the operating system definition of the IBM Workload Scheduler user.
3	Not applicable	
4	The IBM Workload Scheduler installation directory is not empty. You specified as installation folder a directory that exists.	Empty it or specify a different directory.
5	An error occurred checking the IBM Workload Scheduler prerequisites on the workstation.	See the System Requirements Document at IBM Workload Scheduler Detailed System Requirements .

Error Code	Description	User action
6	The IBM Workload Scheduler registry is corrupted.	Use the <code>recovInstReg</code> option to recover the registry. Then, rerun the operation.
7	The upgrade or restore operation cannot retrieve the information from the configuration files.	Check that the previous installation and the <code>localopts</code> , the <code>globalopts</code> , the <code>ita.ini</code> , and the <code>JobManager.ini</code> files are not corrupted. Correct the errors and try again the operation.
8	The upgrade, restore, or uninstallation cannot proceed because there are jobs that are running.	Stop the jobs that are running or wait for these jobs to complete. Restart the operation.
9	The upgrade, restore, or uninstallation cannot proceed because there are files that are locked.	Stop all the processes that are running and close all the activities that can block the installation path. Restart the operation.
10	The upgrade, restore, or uninstallation cannot proceed because there are command lines opened.	Close the command lines. Restart the operation.

Centralized agent update

You can install fix packs or upgrade releases for multiple fault-tolerant agent and dynamic agent instances, by downloading a package on the master domain manager workstation and updating the multiple agent instances by running an action from the Dynamic Workload Console.

You can also schedule the centralized update of multiple agent instances, by using the Dynamic Workload Console or the command line.

The centralized agent update process does not apply to z-centric agents. Also, a distributed master domain manager is required.

During the upgrade or update, the agents are stopped for the shortest time necessary to perform the maintenance. Any active agent command-line interfaces and processes, such as `conman`, `composer`, `netman`, `mailman`, and `batchman`, to name a few, continue running. Any jobs already running when the upgrade process begins, continue to run as planned, however, no new jobs begin execution during this time. Once the upgrade is complete, the agent is restarted and quickly reconnects with its jobs. Any jobs that were actively running before the upgrade that have not yet completed, continue to run, and any jobs that successfully finished running during the upgrade procedure report a successful job status.



Note:

Avoid installing multiple agents (FTA or DA) at the same time on the same system as this could cause the installation to fail.

Centralized agent update by using Dynamic Workload Console

You can centrally update multiple fault-tolerant agent and dynamic agent instances with just one single action by using Dynamic Workload Console.

Before you begin

In the master domain manager `Security` file, you must have `manage` authorization for all the agent workstations for `TWS_master_user`, `root`, or `Administrator` users. If your master domain manager is a version 9.3.0 or later fresh installation, the authorization role is automatically added to the `Security` file. If your master domain manager is an upgraded version 9.3.0 or later instance, you must manually add the authorization.

For more information about the `manage` keyword usage, see the section about object type - `cpu` in *Administration Guide*. For an example of a master domain manager `Security` file, see the section about the security file on the master domain manager to install fix packs or upgrade fault-tolerant agents and dynamic agents in *Administration Guide*.



Note: From an IBM Workload Scheduler master domain manager version 9.3.0 or later, you can centrally update only instances of fault-tolerant agent version 9.3.0 or later and dynamic agent version 9.3.0 or later.

About this task

Complete the following steps:

1. From the installation package download site, download on the master domain manager workstation the fix pack or upgrade installation package that you want to install on fault-tolerant agent or dynamic agent instances in the following default directory:

On Windows operating systems:

```
<TWA_home>\TWS\depot\agent
```

On UNIX operating systems:

```
<TWA_home>/TWS/depot/agent
```

where `TWA_home` is the master domain manager installation directory.

You can change the default directory value performing the following steps:

- Stop WebSphere Application Server Liberty Base on the master domain manager
- Modify the `com.ibm.tws.conn.engine.depot` key value in the following property file:

On Windows operating systems:

```
TWA_home>\usr\servers\engineServer\resources\properties
\TWSConfig.properties
```

On UNIX operating systems:

```
TWA_home>/usr/servers/engineServer/resources/properties/  
TWSConfig.properties
```

- Start WebSphere Application Server Liberty Base

Ensure the installation files are readable by the operating system user which owns the Application Server process (java).

2. Log on to Dynamic Workload Console.
3. Create a **Monitor Workstations** task, as described in the section about creating a task to Monitor Workstations in *Dynamic Workload Console User's Guide*.
4. Run a **Monitor Workstations** task and select one or more dynamic agent or fault-tolerant agent instances that you want to update.
5. Click **More Actions > Update agent**. The Update agent action checks whether the selected agent is a supported workstation type.

The Update agent action is applicable to the following workstation types only:

- Dynamic Agent
- Fault-tolerant agent

The Update agent action is not applicable to the following workstation types:

- Master domain manager
- Backup master domain manager
- Dynamic domain manager
- Backup dynamic domain manager
- Extended agent
- Standard agent
- Remote engine
- Broker
- Pool
- Dynamic pool
- Limited fault-tolerant agent

The process updates the agent only if the workstation type is supported. Otherwise, either an error message is displayed on the Dynamic Workload Console, or is written in the operator log messages console, depending on the workstation type.

You can schedule the centralized update of multiple agent instances, by using the Dynamic Workload Console or the command line. For a description of the scheduling option, see: [Scheduling the centralized agent update on page 273](#).

For a description of the **Update agent** action on fault-tolerant agents and dynamic agents, see: [Updating fault-tolerant agent and dynamic agent instances on page 275](#).

Results

Verify the update agent results by completing one of the following actions in the Dynamic Workload Console:

Check the operator log messages console:

Click **Monitoring and Reporting > Event Monitoring > Monitor Triggered Actions** and check the messages related to the agent workstation update.

The following event rules are triggered:

UPDATESUCCESS

When the workstation is successfully updated

UPDATEFAILURE

When an error occurs

UPDATERUNNING

With the information about the update process status

Check the workstation version changes:

After the next plan update, in the `Monitor Workstations` view of the Dynamic Workload Console, you can check the updated version in the `version` column of the selected agent. Otherwise, if you do not want to wait for the next plan update to see the updated version, run the command **JnextPlan -for 0000** with the **-noremove** option.

You can also perform a **manual check of the update agent results** by looking at the following log files on the agent system:

On Windows operating systems:

```
<TWA_home>\logs\centralized_update.log
```

On UNIX operating systems:

```
<TWA_home>/logs/centralized_update.log
```

Scheduling the centralized agent update

About this task

You can schedule the centralized update of multiple agent instances by creating a centralized agent update job, either by using the Dynamic Workload Console or the **composer** command line.

Creating a centralized agent update job by using the Dynamic Workload Console:

1. Log on to the Dynamic Workload Console.
2. Create a `Centralized agent update` job type definition, as described in "Creating job definitions" in *Dynamic Workload Console User's Guide*.
3. In the properties panel, specify the attributes for the job definition that you are creating. For all the details about available fields and options, see the online help by clicking the "?" in the upper-right corner.
4. In the `Connection` tab, specify the master domain manager workstation where you loaded the fix pack installation package, or the upgrade elmage, that you want to install on fault-tolerant agent or dynamic agent instances.

5. In the **Action** tab, define the list of fault-tolerant agent or dynamic agent instances that you want to update. You can select up to 20 agent instances.
6. Save the job definition in the database.

Creating a centralized agent update job by using the composer command line:

This section describes the required and optional attributes that you need to specify to create a centralized agent update job by using the **composer** command line. For more information, see "Job definition" in *User's Guide and Reference*:

Table 26. Required and optional attributes for the definition of a centralized agent update job

Attribute	Description and value	Required
hostname	The host name of the master domain manager workstation where you loaded the fix pack installation package, or the upgrade elmage, that you want to install on fault-tolerant agent or dynamic agent instances.	✓
port	The port number of the master domain manager workstation.	✓
protocol	The protocol for connecting to the master domain manager workstation. Supported values are http and https .	✓
userName	The user to be used for accessing the master domain manager workstation. This attribute is optional, depending on your settings.	
password	The password to be used for accessing the master domain manager workstation. This attribute is optional, depending on the settings on your server.	
NumberOfRetries	The number of times the program tries to connect to the master domain manager workstation. Default value is 0.	
RetryIntervalSeconds	The number of seconds the program waits before retrying the operation. Default value is 30 seconds.	
workstationListValues	The list of agent instances that you want to update.	✓

Example:

```
<jsdlcentralizedagentupdate:workstationsListValue>
NY053015_AGT (type: Agent, version: 9.3.0.00)
</jsdlcentralizedagentupdate:workstationsListValue>
<jsdlcentralizedagentupdate:workstationsListValue>
NY053009_AGT (type: Agent, version: 9.3.0.00)<
/jsdlcentralizedagentupdate:workstationsListValue>
<jsdlcentralizedagentupdate:workstationsListValue>
NY053016_FTA (type: FTA, version: 9.3.0.00)
</jsdlcentralizedagentupdate:workstationsListValue>
```

You can specify up to 20 agent instances.

Scheduling a centralized agent update job

You can schedule a centralized agent update job by adding the necessary scheduling arguments to your job, and submitting it. You can submit jobs by using the Dynamic Workload Console or the **conman** command line.

When the job runs, the job forwards to the master domain manager the Update agent request for all the fault-tolerant agent or dynamic agent instances that you selected, and then completes.



Note: The job does not wait for the Update agent request to complete. The completion status of the centralized agent update job refers only to the submission of the Update agent request; the completion status does not refer to the agent update results. To verify the agent update results, see the *Results* section in [Centralized agent update by using Dynamic Workload Console on page 271](#).

Job properties

When the job completes, you can see the job properties by running:

```
conman sj job_name:jobprop
```

where *job_name* is the centralized agent update job name.

The following example shows the `Extra Information` section of the output command:

```
EXTRA INFORMATION
The update request has been successfully submitted for the following workstations:
NY053015_AGT|NY053009_AGT|NY053016_FTA
```

Updating fault-tolerant agent and dynamic agent instances

A description of the **Update agent** action on fault-tolerant agents and dynamic agents.

About this task

When you run the `update agent` action in the `Monitor Workstations` task from Dynamic Workload Console, or when you schedule a centralized agent update job, IBM Workload Scheduler completes the following steps:

1. The fix pack or upgrade installation package is copied to the master domain manager workstation, and its content is extracted to the following default directory:

For fault-tolerant agent workstations:

On Windows™ operating systems:

```
<TWA_home>\TWS\stdlist\download
```

On UNIX™ operating systems:

```
<TWA_home>/TWS/stdlist/download
```

For dynamic agent workstations:

On Windows™ operating systems:

```
<TWA_home>\TWS\stdlist\JM\download
```

On UNIX™ operating systems:

```
<TWA_home>/TWS/stdlist/JM/download
```

Where *TWA_home* is the fault-tolerant agent or dynamic agent installation directory. You can change this default directory by modifying the `DownloadDir` value in the following configuration file:

For fault-tolerant agent workstations:

On Windows™ operating systems:

`<TWA_home>\localopts`

On UNIX™ operating systems:

`<TWA_DATA_DIR>/TWS/localopts`

For dynamic agent workstations:

On Windows™ operating systems:

`<TWA_home>\TWS\ITA\cpa\config\JobManager.ini`

On UNIX™ operating systems:

`<TWA_DATA_DIR>/ITA/cpa/config/JobManager.ini`



Note:

If the path specified in `DownloadDir` does not exist, a warning message is issued and the default download directory is used.

If you are updating both fault-tolerant agent and dynamic agent instances on the same workstation, be sure that you specify different download directories.

2. On the agent workstation, the following script runs automatically:

For fault-tolerant agent workstations:

On Windows™ operating systems:

`<TWA_home>\TWS\stdlist\download\.self\selfupdate.wsf`

On UNIX™ operating systems:

`<TWA_DATA_DIR>/stdlist/download/.self/selfupdate.sh`

For dynamic agent workstations:

On Windows™ operating systems:

`<TWA_home>\TWS\stdlist\JM\download\.self\selfupdate.wsf`

On UNIX™ operating systems:

`<TWA_DATA_DIR>/stdlist/JM/download/.self/selfupdate.sh`

The centralized agent update script, named **selfupdate**, performs a backup of the agent workstation, runs the **twinst** installation command, and creates the following log file:

On Windows™ operating systems:

`<TWA_home>\TWS\logs\centralized_update.log`

On UNIX™ operating systems:

```
<TWA_DATA_DIR>/TWS/logs/centralized_update.log
```

**Note:**

If for any reason the agent update fails, the **selfupdate** script restores the agent to its initial status. The backup files are removed after the agent update completes successfully. The backup files are not removed when the agent restore fails or is successful. For more information about restoring agent instances, see the troubleshooting scenario [Manually restore agent instances when the automatic restore fails on page 278](#).

To modify the backup directory, specify the new directory in the BACKUP_DIR variable in the selfupdate.wsf script.

Troubleshooting scenarios

You can troubleshoot the centralized agent update.

You can troubleshoot the centralized agent update by reading the centralized_update log file.

Prerequisite scan detects missing prerequisites and the centralized agent update fails

You are centrally updating dynamic agents or fault-tolerant agents but the prerequisite scan detects missing prerequisites and the agent installation fails.

Cause and solution

The centralized agent update fails because the prerequisite scan detects missing prerequisites. In this case, analyze the prerequisite scan log file and solve the error, if any. You can then decide to rerun the installation or upgrade without executing the prerequisite scan. To do this, perform the following steps:

1. On the master domain manager workstation, go to the directory where you download the fix pack installation package, or the elmage that you want to install on the agent. The default directory value is:

On Windows operating systems:

```
<TWA_home>\TWS\depot\agent
```

On UNIX operating systems:

```
<TWA_home>/TWS/depot/agent
```

where *TWA_home* is the master domain manager installation directory.

2. Edit the following script:

On Windows operating systems:

```
<TWA_home>\TWS\depot\agent\TWS95_agent_platform_AGENT.zip\.self
\selfupdate.wsf
```

On UNIX operating systems:

```
<TWA_home>/TWS/depot/agent/TWS95_agent_platform_AGENT.zip/.self/  
selfupdate.sh
```

3. In the selfupdate script, locate the twsinst installation command and add the `-skipcheckprereq` option. If you specify the `-skipcheckprereq` parameter, the twsinst script does not execute the prerequisite scan. For more information about the `-skipcheckprereq` option, see [Agent installation parameters - twsinst script on page 108](#).

Centralized agent update fails because the temporary backup directory is too small

You are centrally updating dynamic agents or fault-tolerant agents but the backup directory used is too small, and the agent installation fails.

Cause and solution

The centralized agent update fails because the backup directory, by default `/tmp`, does not have enough space. You can set a different directory by performing the following steps:

1. On the master domain manager workstation, go to the directory where you downloaded the fix pack installation package, or the elmage that you want to install on the agent. The default directory value is:

On Windows operating systems:

```
<TWA_home>\TWS\depot\agent
```

On UNIX operating systems:

```
<TWA_home>/TWS/depot/agent
```

where `TWA_home` is the master domain manager installation directory.

2. Edit the following script:

On Windows operating systems:

```
<TWA_home>\TWS\depot\agent\TWS95_agent_platform_AGENT.zip\self  
\selfupdate.wsf
```

On UNIX operating systems:

```
<TWA_home>/TWS/depot/agent/TWS95_agent_platform_AGENT.zip/self/selfupdate.sh
```

3. In the selfupdate script, locate the BACKUP_DIR variable and replace the value to the directory you want to use as backup.



Note: This directory will be removed at the end of the installation.

Manually restore agent instances when the automatic restore fails

You are upgrading dynamic agents or fault-tolerant agents using either the centralized agent update method or the twsinst script, but the update process fails and starts the automatic restore process. If the automatic restore process fails, you need to manually restore the old agent instances.

Cause and solution

The automatic restore process might fail for several causes, for example, the automatic process does not have the necessary space to perform the operation. If you want to manually restore the old agent instance, complete the following steps:

1. On the workstation where the agent is installed, go to the temporary directory, where the selfupdate script backs up the agent installation directory. The default temporary directory value is:

Centralized agent update method

On Windows operating systems:

```
%TEMP%\backupTWS\date
```

On UNIX operating systems:

```
/tmp/backupTWS/date
```

Where *date* is the date of the selfupdate running for your agent instance.

twinsinst script upgrade method

On Windows operating systems:

```
<working_dir>\backupTWS\date
```

On UNIX operating systems:

```
<working_dir>/backupTWS/date
```

where *working_dir* is a temporary directory used by the upgrade process. You define the *working_dir* passing the **-work_dir** parameter to the twinsinst script. If you do not define the *working_dir* then by default it is set to `/tmp/TWA_${INST_USER}/tws94`, where `tmp` is the temporary directory of the operating system and `${INST_USER}` is the user performing the upgrade. For example, on a UNIX operating system: `/tmp/TWA_jsmith/tws94/backup`.

Where *date* is the date of the selfupdate running for your agent instance.

2. Locate the *agent_instance_backup_dir* backup directory for your agent instance.
3. Copy the content of the following directory to the `TWS_agent_inst_dir` agent installation directory:

Centralized agent update method

On Windows operating systems:

```
%TEMP%\backupTWS\date\agent_instance_backup_dir
```

On UNIX operating systems:

```
/tmp/backupTWS/date/agent_instance_backup_dir
```

twinsinst script upgrade method

On Windows operating systems:

```
<working_dir>\backupTWS\date\agent_instance_backup_dir
```

On UNIX operating systems:

`<working_dir>/backupTWS/date/agent_instance_backup_dir`

4. In the `TWS_agent_inst_dir` directory, re-create the `stdlist` directory.
5. Manually delete the following lock file:

Centralized agent update method

On Windows operating systems:

`%TEMP%\twselfupdate.lock`

On UNIX operating systems:

`/tmp/twselfupdate.lock`

twinst script upgrade method

On Windows operating systems:

`<working_dir>\twselfupdate.lock`

On UNIX operating systems:

`<working_dir>/twselfupdate.lock`

6. Restart the agent instance.

Centralized agent update does not complete and no operator message is displayed

You are centrally updating dynamic agents and fault-tolerant agents from Dynamic Workload Console. An agent is in running status in the Dynamic Workload Console, but the update process does not complete and no operator message is displayed.

Cause and solution

The agent has been stopped but the Dynamic Workload Console has not been refreshed yet and reports an incorrect agent status. When the update agent action is selected on this agent, the process cannot start and no operator message is displayed.

To solve this problem, you have to check the agent status locally and restart the agent instance if needed. Then, you have to re-issue the update agent command.

Upgrading agents using HCL BigFix

Use the HCL BigFix Fixlets for IBM Workload Scheduler agents upgrade management to take advantage of:

- The HCL BigFix functions to view IBM Workload Scheduler information about all the agents installed on HCL BigFix endpoints.
- The Fixlets to automatically find all the IBM Workload Scheduler agents on which to install IBM Workload Scheduler upgrades. When the Fixlets become relevant, you can choose to schedule or run immediately an IBM Workload Scheduler upgrade installation.

HCL BigFix provides unified, real-time visibility and enforcement to deploy and manage upgrades to all endpoints from a single console.

Software requirements

Required software

You can use HCL BigFix Fixlets for IBM Workload Scheduler agents upgrade management in a distributed environment, by installing:

- IBM Workload Scheduler V9.3 Fix Pack 3 or later fault-tolerant agents, dynamic agents, IBM Z Workload Scheduler Agents.
- HCL BigFix for Lifecycle Management.

Upgrading remarks

Before you begin to upgrade agents using HCL BigFix, consider the following items:

- Make sure that you have at least 2 GB of free space under the root directory or filesystem (depending on your operating system).
- If on an agent there is more than one IBM Workload Scheduler instance, more than one baseline or Fixlet might be relevant for that agent. Make sure that you apply the baseline or Fixlet in the correct order and that you wait for an action to complete before starting a new one, because only one single action can be taken on the same agent at the same time.
- If there is more than one IBM Workload Scheduler instance installed on an agent; when you run a Fixlet to upgrade to a later level, this upgrade is made on one instance at a time, starting with the first one listed in the IBM Workload Scheduler registry. You cannot select a specific agent.

Creating and subscribing to the IBM Workload Automation Custom Site

The site hosts the IBM Workload Automation Fixlets that are pertinent to your network. To create and subscribe all the computers to the IBM Workload Automation custom site by using the HCL BigFix Console, perform the following procedure:

1. Select **Tools >Create Custom Site**.
2. You are prompted for a name for your custom site. Enter a name, for example, IBM Workload Automation, and click **OK**.
3. Select **All computers** to subscribe all the computers in the HCL BigFix environment to the IBM Workload Automation site.
4. From the **All Content Domain** panel, click the IBM Workload Automation site under **Sites ->Custom** to create the site.
5. From the **Details** tab, enter a description of the site. From the **Domain** pull-down menu, select a Domain to house your site.
6. From the **Computer Subscriptions** tab, indicate which subset of your HCL BigFix computers you want to subscribe to this site. For example **All Computers**.

7. From the **Operator Permissions** tab, you grant specific access permissions to specific operators.
8. Click **Save Changes** on the work area to complete the description of the site. You must enter your password to propagate your new custom site.

Downloading fixlets for IBM Workload Automation

Fixlets for IBM Workload Automation, starting from Version 9.5, Fix Pack 2, are available on the [BigFix.me community web site](#).

An HCL BigFix site is available for each IBM Workload Automation version and contains fixlets for all operating systems supported by the IBM Workload Automation product version.

Use the search function to retrieve the available fixlets, for example you can search for “Workload Automation”, or “IBM® Workload Scheduler”. To access the Sites containing the fixlets and download them, register on the [BigFix.me community web site](#).

The following naming convention is used to name the sites:

```
Workload Automation version.number FPfixpacknumber
```

where

version.number

Is the IBM Workload Automation version.

fixpacknumber

Is the IBM Workload Automation fix pack number.

Importing IBM Workload Automation fixlets on the IBM Workload Automation Custom Site

To import the IBM Workload Automation Fixlets on the IBM Workload Automation Custom Site you created, use the HCL BigFix Console by performing the following procedure:

1. Select **File ->Import**. Using the **Import** dialog you import the `.bes` files, containing all the IBM® Workload Scheduler Fixlets that you downloaded from the [BigFix.me community web site](#)
2. After you click on **Import**, the **Import Content** dialog is displayed. Using it you review each HCL BigFix object to import (contained in `.bse` files) and to choose the site where to create those object. Choose the IBM Workload Automation Custom site as the site where to create the objects.
3. Click **OK** at the bottom of the **Import Content** dialog box to import the objects on the site.
4. From the navigation tree in the **All Content domain Panel**, click the icons labeled **Sites ->Custom Sites ->IBM Workload Automation** to review the imported Fixlets.

Customizing HCL BigFix to manage IBM Workload Scheduler agent upgrades

To customize HCL BigFix to manage an IBM Workload Scheduler agent upgrade, perform the following steps:

1. Open the HCL BigFix Console.
2. Log in to the HCL BigFix server by using the administrative credentials and perform the steps listed in the next sections to configure and customize the HCL BigFix environment to automate the IBM Workload Scheduler upgrade installation.

Enabling and subscribing to the Software Distribution external site

To enable and subscribe all the computers to the Software Distribution site using the HCL BigFix Console, perform the following steps:

1. Open the BigFix Management domain and scroll to the top to view the associated dashboards.
2. From the **License Overview** Dashboard, expand the **Lifecycle Management**, click **Software Distribution** hyperlink in the table of enabled sites.
3. Select the **Computer Subscriptions** tab.
4. Select **All computers** to subscribe all the computers in the HCL BigFix environment to the Software Distribution site.
5. Click **Save Changes** to save the subscription settings.

Installing and registering the Download Plug-in for Software Distribution

To install and register the Download Plug-in for Software Distribution using the HCL BigFix Console, perform the following steps:

1. From the navigation tree in the All Content domain, click **Sites->External Sites->Software Distribution->Fixlets and Tasks**.
2. From the resulting list panel on the right, click the **HCL BigFix Server: Install HCL BigFix Upload Maintenance Service for Software Distribution** Fixlet to open it. Ensure that the **Description** tab is selected.
3. From the **Description** tab, click the link or button corresponding to the Fixlet action. The **Take Action** dialog box is displayed.
4. If needed, you can refine the action settings using the appropriate tabs.
5. Click **OK** at the bottom of the **Take Action** dialog box to propagate the action to all the computers listed in this dialog box.
6. Repeat the procedure for the Fixlet: **HCL BigFix Server: Register Download Plug-in for Software Distribution**.

Uploading the IBM Workload Scheduler images and tools on the HCL BigFix server

To upload the IBM Workload Scheduler product images and the tools to unpack and deploy the product on the HCL BigFix server using the HCL BigFix Console, perform the following steps:

1. Download the IBM Workload Scheduler product images from [IBM Passport Advantage](#) for upgrading agents to a new product version or from [IBM Fix Central](#) for a fix pack release, depending on your platform and agent.
2. In the navigation tree of the Systems Lifecycle domain panel, click **Software Distribution ->Manage Software Distribution Packages**.

3. From the resulting **Package Library** list panel on the right, click **New Package** to create the package for the IBM Workload Scheduler images and the package for the tools. Using the same panel, you must customize all the properties for these packages.
4. In the **Manage Files** tab at the bottom, click **Add Files** to upload the IBM Workload Scheduler images on the HCL BigFix server, one file at a time.
5. From the **Package Library** list panel, add the IBM Workload Scheduler tools package.
6. In the **Manage Files** tab at the bottom, click **Add Files** to upload the IBM Workload Scheduler tools on the HCL BigFix server, one file at a time.



Note: You must add the extract tools for every platform that you need. The extract tools are located in the IBM Workload Scheduler utility tools Multiplatform image that you downloaded from Passport Advantage. The following naming convention, specific for each operating system, was used:

- unzip-aix
- unzip-hpux_ia64
- unzip-linux_s390
- unzip-linux_x86
- unzip-solaris
- unzip-solaris_i386
- unzip-windows.exe

Using HCL BigFix relevant Fixlets to upgrade IBM Workload Scheduler agents

Fixlets and tasks are central to HCL BigFix. Using Relevance statements, they target specific computers, remediating only those HCL BigFix clients affected by an issue. They are both packaged with an action script that can resolve the issue with a simple mouse-click.

For example, IBM Workload Scheduler Fixlets find, if relevant, only the IBM Workload Scheduler agents that have installed a version earlier than 9.5. The related actions then prepare the instance to install the upgrade and then upgrade the agent.

Fixlets and tasks differ mainly on how they get resolved.

A Fixlet is triggered by a Relevance clause that detects a vulnerability, for example a version earlier than 9.5 applied to agents. When an action is invoked to solve the vulnerability, this Fixlet automatically loses relevance and is no longer applicable on that specific HCL BigFix client. When a Fixlet action propagates through your network, you can track its progress using the Console, Web Reports, and the Visualization Tool. When you remedy every HCL BigFix client in your network, the Fixlet is no longer relevant and is removed from the list. If the vulnerability returns, the Fixlet is shown again in the list to address the vulnerability again.

A task comes with one or more action scripts that help you to adjust settings or to run maintenance tasks.

At any time, you can open a Fixlet to inspect the underlying Relevance expressions that are used to target clients, as well as the action scripts that are designed to address the issue. The language used is close to the human language to give

you a high degree of confidence in both applicability and efficacy of the remedial action. You can also see precisely which computers in your network are affected by each Fixlet. When propagated, you can view the progress and ultimate history of each action taken on a client basis.

IBM Workload Scheduler provides the following Fixlets for each operating system to upgrade agents to the new version:

1. **Prepare the upgrade of the IBM Workload Scheduler *type_of_agent* agent to version 9.5 for *platform***
2. **Install the IBM Workload Scheduler *type_of_agent* agent to version 9.5 for *platform***

Where *type_of_agent* can be fault-tolerant, dynamic, for z/OS and *platform* is one of the supported operating systems.

If the first Fixlet is relevant and you click **Take Action**, HCL BigFix prepares the IBM Workload Scheduler agent for the upgrade by performing the following steps:

- Downloads the images from the HCL BigFix server or relay.
- Extracts the images.
- Checks if the IBM Workload Scheduler command line tools are running (`conman`, `composer`, `fileaid`). If they are running, the action fails.
- Enables the Install Fixlet for the upgrade

If one of the actions fails, the Fixlet fails and remains relevant. You can check the failed action by using the **Status** tab of the action. Perform the necessary steps to solve the problems on the agents and rerun the action.



Note: If the extract step fails, check if the extract tool is present on the agent. If it is not present, install the extract tool and rerun the action.



Note: If the procedure to prepare the agent upgrade fails with the following error:

```
Completed // Delete $TMP/run.sh
Completed delete "{parameter "TMP"}/run.sh"
Completed // Move __createfile to $TMP/run.sh
Completed move __createfile "{parameter "TMP"}/run.sh"
Completed // Execute run.sh
Completed wait sh "{parameter "TMP"}/run.sh"
Completed // Continue if the return code of the previous command was 0
Failed continue if {exit code of action = 0}
```

the problem is caused by an IBM Workload Scheduler process that did not stop. To solve the problem, run the following actions:

1. On UNIX operating systems, check the file:

```
/tmp/TWA/tws952/tws952_process_agent_user.txt
```

to find information about the process that is still running.

2. Kill the process.
3. Rerun the action.



To find information about the log file location for HCL BigFix on several operating systems, see: [HCL BigFix Common File Locations](#) .

If all the actions succeed, the Fixlet is no longer relevant and the next Fixlet becomes relevant. If you click **Take Action** for the new one, it upgrades the previously prepared agent instance to 9.5, performing the following steps:

- Upgrades the instance.
- Resets the fence to the original value.
- Links back to the domain manager.

Also in this case you can check the status of the action through the relative tab and, in case of errors, solve the problems and rerun the action until it succeeds.

Displaying relevant IBM Workload Scheduler Fixlets

To display an IBM Workload Scheduler Fixlet using the HCL BigFix Console, perform the following procedure:

1. From the navigation tree in the **Domain** Panel, click the icon labeled **Fixlets and Tasks**. The list panel is displayed on the right.
2. From the list panel, click any IBM Workload Scheduler Fixlet to open it. The body of the Fixlet message is displayed in the work area.
3. Each Fixlet contains a work area with the following four tabs:

Description

This page provides a descriptive explanation of the problem and one or more actions to fix it. The actions are represented by links at the bottom of the description page. Click an action to open the **Take Action** dialog, to choose other targets, or to schedule the action. If you click by mistake an action hyperlink before the actual deployment, you always have the chance to modify or cancel the action.

Details

This dialog contains the Fixlet and task properties such as category, security ID, download size, source, severity, and date. It also lists the code behind the Relevance expressions and the actions. In a text box at the bottom of this dialog, you can type a comment that remains attached to this item.

Applicable Computers

This is a list of all the computers targeted by the selected Fixlet or task. You can filter the list by selecting items from the folders on the left, and sort the list by clicking the column headers.

Action History

This is a list of actions that have been deployed by this Fixlet or task. If this item is new, the list is empty. You can filter the actions using the left panel, and sort them by clicking the column headers above the right-hand list.

Deploying IBM Workload Scheduler actions

To deploy an IBM Workload Scheduler action using the HCL BigFix Console, perform the following procedure:

1. Click the list panel to open a relevant Fixlet or task. Make sure the **Description** tab is selected.
2. Read the description carefully. Scroll down to see the suggested actions.
3. Click the **Details** tab and search the action. Examine the Relevance section and the action script itself.
4. In the **Description** tab, click the link corresponding to the Fixlet action or click the **Take Action** button.
5. The **Action Parameter** pop-up window is displayed. Provide the required information. Click **OK**.
6. The **Take Action** dialog box is displayed. In the **Preset** pull-down menu, you can accept the default settings or select **Policy** to set an action with no expiration date. For more information about presets, see the section about **Custom Actions**.
 - a. You can refine the list of targeted computers using the **Target** tab. Use the computer tree in the left panel to filter the list of workstations in the right panel.
 - b. In the **Execution** tab, you can set various scheduling constraints and behaviors.
 - c. In the **Messages** tab, you can create an optional message to be shown on the HCL BigFix client computers.
 - d. In the **Action Script** tab, operators with Custom Authoring permissions can modify the action script.
 - e. Use the other interface tabs to further modify the Action settings.
7. Click **OK**



Note: If you are taking an action that applies to different computers, when you are prompted to insert values for the action parameters, you must leave the default values; you must not specify other values.

The action is propagated to all the computers targeted in the **Take Action** dialog. After the action ends successfully and the targeted computers are fixed, those computers no longer report this Fixlet as relevant.

Monitoring IBM Workload Scheduler actions

When you decide to take a proposed action, you have several deployment options. For example, you might schedule the action to run unattended after midnight or to run with user involvement during the day.

After you schedule the actions, the HCL BigFix server attempts to identify the computers suitable for those actions. Ideally, the HCL BigFix client gathers the action information from the action site and performs it immediately. However, some computers might be powered off and others might be mobile devices undocked when the action is deployed. As soon as these computers become available, the remedial action is applied.

To monitor a deployed action, using the HCL BigFix Console, click the **Actions** icon in the Domain panel navigation tree.

If you have not yet deployed an action or all the actions completed, this list is empty. Otherwise, click any action to view its status, whether it is evaluating, waiting, running, fixed, or failed. You can also add comments to the action.

Actions might go through several states as they are collected, evaluated, and run by clients.



Note: If an action failed for any reason and its state is Open, before running it again, make sure to stop it and that it is not listed in the actions list.

Upgrading when there are corrupt registry files

If you have tried to upgrade a stand-alone, fault-tolerant agent (an agent that is not shared with other components or does not have the connector feature) and received an error message that states that an instance of IBM Workload Scheduler cannot be found, this can be caused by a corrupt registry file. It is possible to upgrade a stand-alone, fault-tolerant agent that has corrupt registry files without having to reinstall the product. IBM Workload Scheduler has a recovery option you can run to re-create the necessary files. You can also use this option when upgrading nodes in clusters, where the node on which you want to perform the upgrade is not available or is in an inconsistent state. The recovery option re-creates the registry files and the Software Distribution information without having to reinstall the complete product.

You can run the recovery option using the **twsinst** script.

Re-creating registry files using twsinst

To re-create the registry files while upgrading an agent by using the **twsinst** script, from the directory that contains the IBM Workload Scheduler agent image, run **twsinst** using the synopsis described below.

Synopsis:

On Windows™ operating systems:

Show command usage and version

```
twsinst -u | -v
```

Upgrade an instance

```
twsinst -update -uname user_name -password password
..-acceptlicense yes|no
  [-domain user_domain]
  [-recovInstReg true]
  [-inst_dir install_dir]
```

Example

```
cscript twsinst -update -uname twsuser -password twspassword
-acceptlicense yes -inst_dir "C:\Program Files\IBM\TWA"
-recovInstReg true
```

On UNIX™ and Linux™ operating systems

Show command usage and version

```
./twsinst -u | -v
```

Upgrade an instance

```
./twsinst -update -uname user_name
..-acceptlicense yes|no
..[-inst_dir install_dir]
..[-recovInstReg true]
```


Example

```
./twsinst -update -uname twsuser -inst_dir /opt/IBM/TWA  
-acceptlicense yes -recovInstReg true
```

For information about the **twsinst** parameters, see [Procedure on page 258](#).

Chapter 19. Updating containers

Updating the container configuration parameters.

To change the container configuration parameters or to obtain the latest version of a container, an update is required.

To update a container, proceed as follows:

- **IBM Workload Automation containers in IBM Cloud Private**

Load the new helm chart, then access the IBM® Cloud Private Console, go to the "Helm Release" page and click on the **Upgrade** button.

- **Docker containers**

Complete the following procedure to update a Docker container.

1. Log in to [My IBM Container software library](#) with your IBMid and password.
2. From the Container software library, click Copy key to copy the Entitlement key.
3. Run the following command to log into the IBM Entitled Registry:

```
docker login -u cp -p <your_entitlement_key> cp.icr.io
```

4. Manually update the compose file by modifying the *image* name if docker-compose does not reference the version to which you want to update.
5. Launch the "`docker-compose up -d`" command.



Note:

- Launching the "`docker-compose up -d`" command, the container is restarted and the database schema is automatically updated. If you are planning to update both the IBM Workload Automation server MDM and BKM, ensure that you run the command for one component at a time. To avoid database conflicts, start the second component only when the first component has completed successfully.
- In a Docker environment, if your server component uses a timezone different from the default timezone, then to avoid problems with the FINAL job stream, you must update `MAKEPLAN` within the `DOCOMMAND`, specifying the **timezone** parameter and value. For example, if you are using the America/Los Angeles timezone, then it must be specified as follows:

```
$JOBS  
  
WA_WA-SERVER_XA#MAKEPLAN  
DOCOMMAND "TODAY_DATE=`${UNISONHOME}/bin/datecalc today pic YYYYMMDD`;  
  ${UNISONHOME}/MakePlan -to `${UNISONHOME}/bin/datecalc ${TODAY_DATE}070  
0 + 1 day + 2 hours pic MM/DD/YYYY^HHTT` timezone America/Los_Angeles"  
STREAMLOGON wouser  
DESCRIPTION "Added by composer."  
TASKTYPE OTHER  
SUCCOUTPUTCOND CONDSUCC "(RC=0) OR (RC=4)"  
RECOVERY STOP
```

Only the following parameters can be modified with the update:

- db.type
- db.hostname
- db.port
- db.name
- db.tsName
- db.tsPath
- db.tsLogName
- db.tsLogPath
- db.tsPlanName
- db.tsPlanPath
- db.tsTempName
- db.tssbpace
- db.user
- db.adminUser
- db.sslConnection
- wa_password
- db_admin_password
- db_password

Part V. Applying a fix pack

This section describes how to apply a fix pack to IBM Workload Scheduler, repair an updated version and return to a previous product version level.

[Installing the fix pack on page 294](#)

Use this procedure to update from General Availability version 9.5 to the latest fix pack level.

[Repairing an updated version on page 301](#)

Reinstall the same version and substitute the current binaries when an error occurs. The repair procedure is available starting from General Availability version 9.5 to the latest fix pack.

[Returning to a previous product version level on page 304](#)

Revert from the latest fix pack to General Availability version 9.5 or to an intermediate fix pack.

Chapter 20. Downloading installation images

Complete this procedure to download the installation images.

About this task

To install the fix pack, download the installation images from [IBM Fix Central](#).

1. Ensure that your workstation has sufficient space to store the compressed file containing the installation images. For more information about system requirements, see [IBM Workload Scheduler Detailed System Requirements](#).
2. From [IBM Fix Central](#), download the compressed file, containing the latest fix pack image, to a temporary directory.
3. Extract the installation image from the downloaded file and verify that the installation image is complete.

Extract the content of the ZIP files into a directory, using one of the extraction tools available on your system or that can be downloaded from the internet. The tool you use must be able to keep the file permissions on the extracted files, for example, infozip. On Windows™ systems, ensure that you extract the image into a path that is not very long, otherwise, the file name might be truncated. The maximum length allowed is 255 characters. If you are installing on a UNIX™ operating system, run the following command:

```
chmod -R 755 <imagesDir>
```



Note: To extract the **.zip** file onto a Windows™ 64-bit system, ensure that the image is not located on the desktop because the Windows™ operating system extract tool has a problem. Choose another directory into which to extract the Fix Pack image.

For more information about images, see the section about fix pack readmes in [IBM Workload Automation product information](#).

Chapter 21. Installing the fix pack

Update IBM Workload Scheduler from the command-line interface.

Complete this procedure to apply the latest fix pack to your General Availability version 9.5 or 9.5.0.x components.

Before installing the Fix Pack, ensure you have installed the required prerequisite software. To obtain the latest information about software requirements, run the [Software Requirements](#) report and browse to the relevant section.

To upgrade from version 9.3.x, 9.4.x to latest fix pack level, see [Before upgrading on page 202](#).

Related information

[Updating the master domain manager and its backup on page 294](#)

[Updating the dynamic domain manager on page 298](#)

[Updating the Dynamic Workload Console on page 299](#)

Updating the master domain manager and its backup

Complete this procedure to apply the latest fix pack to your General Availability version 9.5 or 9.5.0.x components.

About this task

Update a master domain manager and a backup master domain manager at the latest fix pack level by running the **serverinst** script. Launch the script on the workstation where the master domain manager is running to update the master domain manager, then launch the script on the workstation where the backup master domain manager is running to update the backup master domain manager.

1. Log in as root or Administrator to the workstation where you plan to install.
2. Download the installation images from [IBM Fix Central](#).
3. Browse to the folder `image_location>/TWS/interp_name`.
4. To update the database version, run the following command:

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype db_type --dbhostname db_hostname --dbport db_port --  
dbname db_name --dbuser db_user --dbpassword db_password --dbadminuser db_administrator --  
dbadminuserpw db_administrator_password
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype db_type --dbhostname db_hostname --dbport db_port --dbname db_name  
--dbuser db_user --dbpassword db_password --dbadminuser db_administrator --dbadminuserpw  
db_administrator_password
```

5. Start the installation launching the following command:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --inst_dir INST_DIR
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --inst_dir INST_DIR
```

where *INST_DIR* is the directory where IBM Workload Scheduler is installed. To find out the installation directory, see the topic about finding out what has been installed in which IBM Workload Automation instances in *Administration Guide*.



Note: The **acceptlicense** and **inst_dir** parameters are required. All other parameters are ignored by the **serverinst** command, except for the following two optional parameters: **lang** and **skipcheckprereq**.

For further details about commands, see [Reference on page 345](#).

- To align the database tables, run the following command:

```
planman resync
```



Note: Before running the "planman resync" command, check to see if batchman process is up and running. If batchman is down, then run the "conman start" command. If batchman is down, then planman resync remains in hang status.

- To link all fault-tolerant agents, type the following command:

```
conman "link @!/@/@ "
```

Results

To verify that the installation completed successfully, browse to the directory where you installed the master domain manager and type the following commands:

```
./twc_env.sh
optman ls
```

This command lists the IBM Workload Scheduler configurations settings and confirms that IBM Workload Scheduler installed correctly.

What to do next

Proceed to completing the security configuration.

Completing the security configuration

About this task

After updating the master domain manager and backup master domain manager with the fix pack, complete the security configuration. There are a few tasks to complete that can vary depending on whether you are using the default role-based security model, or the classic security model.

Role-based security model

To quickly and easily update your security file with the latest changes introduced with folders, open any access control list definition and make a small change. A single change propagates an update to the entire file. The following is an example of a small change that propagates an update to the entire file:

1. From the Dynamic Workload Console, click **Administration > Manage Workload Security**.
2. In **Access Control List**, select **Manage accesses**.
3. Select the **TWSUSER** access control list and click **Edit**.
4. Remove the **FULLCONTROL** role, then add it back again.
5. Click **Save and Exit**.

The folder attribute is automatically added to all scheduling CPU objects, and the cpufolder attribute is added to the job, job stream, userobj, resources, and parameter objects.

Classic security model

If you use the classic security model and have specific security settings in your current environment, these settings must be manually merged with the new settings before you build the final security file to be used in your new environment. The statements you might have to add manually vary depending on your specific security settings.

To manually merge the new settings, complete the following procedure:

1. Log in as *TWS_user* on your upgraded master domain manager and set the IBM Workload Scheduler environment.
2. If you have centralized security enabled, extract the new security file on the master using the command:

```
dumpsec > sec_file
```

where *sec_file* is the text file created by the dumpsec command.

3. Edit the *sec_file*, and insert the following statements in all of the stanzas in the file:

Folder

```
FOLDER NAME=/ ACCESS=ADD,DELETE,DISPLAY,MODIFY,USE,LIST,UNLOCK, ACL
```

Folder access must be given to scheduling objects and access to the folder in which the workstation is defined must be given for the JOB, SCHEDULE, USEROBJ, RESOURCE, and PARAMETER objects:

```
job          cpu=@ + folder = / + cpufolder = / access=@
schedule     cpu=@ + folder = / + cpufolder = / access=@
cpu          cpu=@ + folder = / access=@
userobj      cpu=@ + cpufolder = / access=@
resource     cpu=@ + folder = / + cpufolder = / access=@
prompt       + folder = / access=@
calendar     + folder = / access=@
eventrule    name=@ + folder = /
             access=add,delete,display,modify,list,unlock
parameter    cpu=@ + folder = / + cpufolder = / access=@
```



```
runcygrp      name=@ + folder = /
  access=add,delete,display,modify,use,list,unlock
varlable     name=@ + folder = /
  access=add,delete,display,modify,use,list,unlock
wkldappl     name=@ + folder = /
  access=add,delete,display,modify,list,unlock
```

Workload application

```
WKLDAPPL NAME=@ + FOLDER = / ACCESS=ADD,DELETE,DISPLAY,MODIFY,LIST,UNLOCK
```

Run cycle group

```
RUNCYGRP NAME=@ + FOLDER = / ACCESS=ADD,DELETE,DISPLAY,MODIFY,USE,LIST,UNLOCK
```

Centralized agent update

Replace the statement:

```
CPU CPU=@
ACCESS=ADD,CONSOLE,DELETE,DISPLAY,FENCE,LIMIT,LINK,MODIFY,SHUTDOWN,
START,STOP,UNLINK,LIST,UNLOCK,RUN,RESETFTA
```

with the following statement:

```
CPU CPU=@ + FOLDER = /
ACCESS=ADD,CONSOLE,DELETE,DISPLAY,FENCE,LIMIT,LINK,MODIFY,SHUTDOWN,
START,STOP,UNLINK,LIST,UNLOCK,RUN,RESETFTA,MANAGE
```

Adding members to workstation class

Following the upgrade, to create or modify workstation classes, you must add USE access to CPU objects that are members, or that will be added as members to a workstation class.

```
CPU CPU=@ + FOLDER = /
ACCESS=ADD,CONSOLE,DELETE,DISPLAY,FENCE,LIMIT,LINK,MODIFY,SHUTDOWN,
START,STOP,UNLINK,LIST,UNLOCK,RUN,RESETFTA,MANAGE,USE
```

4. Check that the user permissions of the new statements are correct and, if necessary, add the user of your old master domain manager to the security file of the master you just upgraded.
5. Due to new support of the UPN Windows user, if you have Windows domain users that are defined in the logon fields as `domain\username`, insert the escape character `'\'` before the `'\'` character in the `domain\username` value. For example, if you use the `MYDOMAIN\user1` value in the logon field, after the upgrade, in the Security file you must update the line in following way:

```
.....
logon=MYDOMAIN\\user1
.....
```

6. Save your changes to the `sec_file`.
7. Build your final security file for your new master domain manager using the `makesec` command:

```
makesec sec_file
```

8. If you have centralized security enabled, distribute the security file.

Run `JnextPlan -for 0000` to distribute the Symphony file to the agents.



Note: Ensure that the `optman cf` option is set to all or only the unfinished job streams are carried forward.

9. Restore the previous setting of the `optman cf` option, if necessary.

What to do next

You can now proceed to [Updating the dynamic domain manager on page 298](#).

Updating the dynamic domain manager

Complete this procedure to update the dynamic domain manager and the backup dynamic domain manager from General Availability version 9.5 to the latest fix pack level.

About this task

Update a dynamic domain manager and a backup dynamic domain manager at the latest fix pack level by running the `serverinst` script. Launch the script on the workstation where the dynamic domain manager is running to update the dynamic domain manager, then launch the script on the workstation where the backup dynamic domain manager is running to update the backup dynamic domain manager.

1. Log in as root or Administrator to the workstation where you plan to install.
2. Download the installation images from [IBM Fix Central](#).
3. Browse to the folder `image_location/TWS/interp_name`.
4. To update the database version, run the following command:

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype db_type --dbhostname db_hostname --dbport db_port --
dbname db_name --dbuser db_user --dbpassword db_password --dbadminuser db_administrator --
dbadminuserpw db_administrator_password
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype db_type --dbhostname db_hostname --dbport db_port --dbname db_name
--dbuser db_user --dbpassword db_password --dbadminuser db_administrator --dbadminuserpw
db_administrator_password
```

5. Start the installation launching the following command:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --inst_dir INST_DIR
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --inst_dir INST_DIR
```

where `<INST_DIR>` is the directory where the dynamic domain manager and the backup dynamic domain manager are installed. To find out the installation directory, see the topic about finding out what has been installed in which IBM Workload Automation instances in *Administration Guide*.



Note: The `acceptlicense` and `inst_dir` parameters are required. All other parameters are ignored by the `serverinst` command, except for the following two optional parameters: `lang` and `skipcheckprereq`.

For further details about commands, see [Reference on page 345](#).

Updating the Dynamic Workload Console

Complete this procedure to update the Dynamic Workload Console from General Availability version 9.5 to the latest fix pack level.

About this task

When updating the IBM Workload Scheduler environment, it is a good practice to update the Dynamic Workload Console first. If you update the console to the latest fix pack level, you can then use it to verify that your environment is working after updating the remaining components.

If you are using the default database Derby, you can skip this step. If you are using a database other than Derby, create and populate the database tables for the Dynamic Workload Console by following the procedure below.

1. Log in to the workstation where you plan to install the Dynamic Workload Console.
2. Download the installation images from [IBM Fix Central](#).
3. Browse to the folder `image_location`.
4. To update the database version, run the following command:

On Windows operating systems

```
cscript configureDb.vbs --rdbmstype db_type --dbhostname db_hostname --dbport db_port --
dbname db_name --dbuser db_user --dbpassword db_password --dbadminuser db_administrator --
dbadminuserpw db_administrator_password
```

On UNIX operating systems

```
./configureDb.sh --rdbmstype db_type --dbhostname db_hostname --dbport db_port --dbname db_name
--dbuser db_user --dbpassword db_password --dbadminuser db_administrator --dbadminuserpw
db_administrator_password
```

On z/OS operating systems

```
./configureDb.sh --rdbmstype db_type --dbhostname DB_hostname
--dbport db_port --dbname db_name --dbuser db_user
--dbadminuser DB_admin_user --dbadminuserpw DB_admin_pwd
--zlocationname zOS_location_containing_db --zbufferpoolname buffer_pool_in_zOS_location
```

For more information about all parameters and supported values of the `configureDb` command, see [Database configuration - configureDB script on page 345](#).

5. Start the installation launching the following command:

On Windows operating systems

```
cscript dwcinst.vbs --acceptlicense yes --inst_dir INST_DIR
```

On UNIX operating systems

```
./dwcinst.sh --acceptlicense yes --inst_dir INST_DIR
```

On z/OS operating systems

```
./dwcinst.sh --acceptlicense yes --inst_dir INST_DIR
```

where *INST_DIR* is the path to the Dynamic Workload Console installation directory. For example, if the console is installed in `/opt/wa/DWC`, then the value of *INST_DIR* is `/opt/wa`. For information about the installation directory, see the topic about finding out what has been installed in which IBM Workload Automation instances in *Administration Guide*.



Note: The **acceptlicense** and **inst_dir** parameters are required. All other parameters are ignored by `dwcinst` command, except for the following two optional parameters: **lang** and **skipcheckprereq**.

For further details about commands, see [Reference on page 345](#).

Updating agents

Update the agent from General Availability version 9.5 to the latest fix pack level.

See the [Upgrading agents on page 256](#) chapter to update an agent at the latest fix pack level.

Chapter 22. Repairing an updated version

The repairing procedure can be performed from General Availability version 9.5 to latest Fix Pack.

The repairing procedure is useful to reinstall the same version and substitute the current binaries when an error occurs during or after the installation.

Related information

[Repairing the master domain manager and its backup on page 301](#)

[Repairing the dynamic domain manager on page 302](#)

[Repairing the Dynamic Workload Console on page 302](#)

Repairing the master domain manager and its backup

Complete this procedure to repair an updated version of the master domain manager and the backup master domain manager.

About this task

Download the installation image that has the same version as the current one.

Update a master domain manager and a backup master domain manager at the latest fix pack level by running the **serverinst** script. Launch the script on the workstation where the master domain manager is running to update the master domain manager, then launch the script on the workstation where the backup master domain manager is running to update the backup master domain manager.

1. Log in as root or Administrator to the workstation where you plan to install.
2. Download the installation images from [IBM Fix Central](#).
3. Browse to the folder `<image_location>/TWS/interp_name`.
4. Start the installation launching the following command:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --inst_dir INST_DIR
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --inst_dir INST_DIR
```

where `<INST_DIR>` is the directory where the components are installed. To find out the installation directory, see the topic about finding out what has been installed in which IBM Workload Automation instances in *Administration Guide*.



Note: The **acceptlicense** and **inst_dir** parameters are required. All other parameters are ignored by **serverinst** command, except for the following three optional parameters: **lang**, **work_dir** and **skipcheckprereq**.

For further details about commands, see [Reference on page 345](#).

Repairing the dynamic domain manager

Complete this procedure to repair an updated version of the dynamic domain manager and the backup dynamic domain manager.

About this task

Download the installation image that has the same version as the current one.

Update a dynamic domain manager and a backup dynamic domain manager at the latest fix pack level by running the **serverinst** script. Launch the script on the workstation where the dynamic domain manager is running to update the dynamic domain manager, then launch the script on the workstation where the backup dynamic domain manager is running to update the backup dynamic domain manager.

1. Log in as root or Administrator to the workstation where you plan to install.
2. Download the installation images from [IBM Fix Central](#).
3. Browse to the folder *image_location/TWS/interp_name*.
4. Start the installation launching the following command:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --inst_dir INST_DIR
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --inst_dir INST_DIR
```

where *<INST_DIR>* is the directory where the dynamic domain manager and the backup dynamic domain manager are installed. To find out the installation directory, see the topic about finding out what has been installed in which IBM Workload Automation instances in *Administration Guide*.



Note: The **acceptlicense** and **inst_dir** parameters are required. All other parameters are ignored by **serverinst** command, except for the following three optional parameters: **lang**, **work_dir** and **skipcheckprereq**.

For further details about commands, see [Reference on page 345](#).

Repairing the Dynamic Workload Console

Complete this procedure to repair an updated version of the Dynamic Workload Console.

About this task

Download the installation image that has the same version as the current one.

1. Log in to the workstation where you plan to install the Dynamic Workload Console.
2. Download the installation images from [IBM Fix Central](#).
3. Browse to the folder *<image_location>*.
4. Start the installation launching the following command:

On Windows operating systems

```
cscript dwcinst.vbs --acceptlicense yes --inst_dir <INST_DIR>
```

On UNIX operating systems

```
./dwcinst.sh --acceptlicense yes --inst_dir <INST_DIR>
```

where *<INST_DIR>* is the directory where the Dynamic Workload Console is installed.



Note: The **acceptlicense** and **inst_dir** parameters are required. All other parameters are ignored by `serverinst` command, except for the following three optional parameters: **lang**, **work_dir** and **skipcheckprereq**.

For further details about commands, see [Reference on page 345](#).

Chapter 23. Returning to a previous product version level

You can revert from the latest fix pack to General Availability version 9.5 or to an intermediate fix pack.

If you installed a fix pack on top of General Availability version 9.5, you can return to the General Availability version 9.5 or to an intermediate fix pack.

Related information

[Returning the master domain manager and its backup to a previous product version level on page 304](#)

[Returning the dynamic domain manager to a previous product version level on page 305](#)

[Returning the Dynamic Workload Console to a previous product version level on page 306](#)

Returning the master domain manager and its backup to a previous product version level

Complete this procedure to return the master domain manager and the backup master domain manager to a previous version.

About this task

To perform this operation, you need to download the installation image of the version you want to return to.



Note: If you used the new functions introduced with the latest release, you cannot roll back your environment to the previous version because new records have been created in the database and they are not compatible with previous versions.

Return a master domain manager and a backup master domain manager to a previous product version level by running the **serverinst** script. Launch the script on the workstation where the master domain manager is running to revert the master domain manager, then launch the script on the workstation where the backup master domain manager is running to revert the backup master domain manager.

1. Log in as root or Administrator to the workstation where you plan to install.
2. Download the installation images from [IBM Fix Central](#).
3. Browse to the folder `<image_location>/TWS/interp_name`.
4. Start the installation launching the following command:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --inst_dir INST_DIR
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --inst_dir INST_DIR
```


where `<INST_DIR>` is the directory where the components are installed. To find out the installation directory, see the topic about finding out what has been installed in which IBM Workload Automation instances in *Administration Guide*.



Note: The `acceptlicense` and `inst_dir` parameters are required. All other parameters are ignored by `serverinst` command, except for the following three optional parameters: `lang`, `work_dir` and `skipcheckprereq`.

For further details about commands, see [Reference on page 345](#).

Returning the dynamic domain manager to a previous product version level

Complete this procedure to roll back the dynamic domain manager and the backup dynamic domain manager to a previous product version level.

About this task

To perform this operation, you need to download the installation image of the version you want to return to.



Note: If you used the new functions introduced with the latest release, you cannot roll back your environment to the previous version because new records have been created in the database and they are not compatible with previous versions.

Return a dynamic domain manager and a backup dynamic domain manager to a previous product version level by running the `serverinst` script. Launch the script on the workstation where the dynamic domain manager is running to revert the dynamic domain manager, then launch the script on the workstation where the backup dynamic domain manager is running to revert the backup dynamic domain manager.

1. Log in as root or Administrator to the workstation where you plan to install.
2. Download the installation images from [IBM Fix Central](#).
3. Browse to the folder `image_location/TWS/interp_name`.
4. Start the installation launching the following command:

On Windows operating systems

```
cscript serverinst.vbs --acceptlicense yes --inst_dir INST_DIR
```

On UNIX operating systems

```
./serverinst.sh --acceptlicense yes --inst_dir INST_DIR
```

where `<INST_DIR>` is the directory where the dynamic domain manager and the backup dynamic domain manager are installed. To find out the installation directory, see the topic about finding out what has been installed in which IBM Workload Automation instances in *Administration Guide*.



Note: The **acceptlicense** and **inst_dir** parameters are required. All other parameters are ignored by `serverinst` command, except for the following three optional parameters: **lang**, **work_dir** and **skipcheckprereq**.

For further details about commands, see [Reference on page 345](#).

Returning the Dynamic Workload Console to a previous product version level

Complete this procedure to return the Dynamic Workload Console to a previous product version level.

About this task

To perform this operation, you need to download the installation image of the version you want to return to.



Note: If you used the new functions introduced with the latest release, you cannot roll back your environment to the previous version because new records have been created in the database and they are not compatible with previous versions.

Return the Dynamic Workload Console to a previous product version by running the **dwcinst** script. Launch the script on the workstation where the Dynamic Workload Console is running.

1. Log in to the workstation where you plan to install the Dynamic Workload Console.
2. Download the installation images from [IBM Fix Central](#).
3. Browse to the folder `<image_location>`.
4. Start the installation launching the following command:

On Windows operating systems

```
cscript dwcinst.vbs --acceptlicense yes --inst_dir <INST_DIR>
```

On UNIX operating systems

```
./dwcinst.sh --acceptlicense yes --inst_dir <INST_DIR>
```

where `<INST_DIR>` is the directory where the Dynamic Workload Console is installed.



Note: The **acceptlicense** and **inst_dir** parameters are required. All other parameters are ignored by `serverinst` command, except for the following three optional parameters: **lang**, **work_dir** and **skipcheckprereq**.

For further details about commands, see [Reference on page 345](#).

Part VI. Moving your workload from an on-premises to a cloud environment

A quick procedure to move your workload from an on-premises to a cloud environment

About this task

Moving your workload from an on-premises to a cloud environment is a quick procedure which involves configuring SSL communication between your existing on-premises master domain manager and a new backup master domain manager on the cloud. You then switch permanently domain management capabilities from the on-premises master domain manager to the backup master domain manager on the cloud to shift your whole workload to the cloud. This procedure requires the on-premises master domain manager to be at Version 9.5 Fix Pack 3 or later.

At the end of the procedure, you will have switched your master domain manager to the cloud and set up your dynamic agents to work in SSL mode with the on-cloud master domain manager

This procedure applies to the following clusters:

Amazon Elastic Kubernetes Service (EKS)

For this cluster, you can use an ingress-type network or a load-balancer network. To specify which network type you want to use, set the relevant parameters in the `values.yaml` file. For detailed information, see the **Network enablement** section in [IBM Workload Automation](#).

OpenShift

For this cluster, you can only use routes as network service. An OpenShift Container Platform route allows you to associate a service with an externally-reachable host name. This edge host name is then used to route traffic to the service. For more information, see the readmes available in [Deploying IBM Workload Automation components on Red Hat OpenShift on page 157](#) the section about Deploying product components on Red Hat OpenShift in *Planning and Installation Guide*.



Note: On-premises fault-tolerant agents cannot connect to an on-cloud master domain manager.

On-premises side operations

Before you begin

Ensure the following conditions are met for your on-premises master domain manager:

- Version 9.5, Fix Pack 3 or later is installed.
- The port number used by the `netman` process to listen for communication from the dynamic domain manager (**brnetmanport**) is set to the default **41114** value.
- Ensure the SECURITYLEVEL attribute is set to `force`, or `force_enabled`. For more information about workstation definition parameters, see the section about workstation definition in .

About this task

Perform the following operations on the on-premises side:

1. Set the IBM® Workload Scheduler environment variables:

In UNIX®:

- `./TWA_home/TWS/tws_env.sh` for Bourne and Korn shells
- `./TWA_home/TWS/tws_env.csh` for C shells

In Windows®:

- `TWA_home\TWS\tws_env.cmd`

2. Configure your master domain manager for SSL communication using the modify command:

```
composer modify ws your_master_domain_manager
```

- a. In the **secureaddr** argument, define the port used to listen for incoming SSL connections, for example 31113 or another available port.
- b. In the **securitylevel** argument, specify `enabled` to set the master domain manager to uses SSL authentication only if its domain manager workstation or another fault-tolerant agent below it in the domain hierarchy requires it.

See the following example:

```
CPUNAME your_mdm_name
DESCRIPTION "MANAGER CPU"
OS UNIX
NODE your_IP_address TCPADDR 31111
SECUREADDR 31113
DOMAIN MASTERDM
FOR MAESTRO
TYPE MANAGER
AUTOLINK ON
BEHINDFIREWALL OFF
SECURITYLEVEL ENABLED
FULLSTATUS ON
END
```

For more information about the modify command and the workstation definition, see the related sections in *User's Guide and Reference*.

3. Modify the `localopts` file to enable SSL communication, as follows:

- a. Browse to the `TWA_DATA_DIR` folder.
- b. Edit the following properties in the `localopts` file. See the following example:

```
nm SSL full port    =0
nm SSL port        =31113
SSL key            ="/install_dir/ssl/OpenSSL/TWSClient.key"
SSL certificate    ="/install_dir/ssl/OpenSSL/TWSClient.cer"
SSL key pwd       ="/install_dir/ssl/OpenSSL/password.sth"
SSL CA certificate ="/install_dir/ssl/OpenSSL/TWSTrustCertificates.cer"
SSL random seed   ="/install_dir/ssl/OpenSSL/TWS.rnd"
```

where:

nm SSL port

Is the port used to listen for incoming SSL connections, when full SSL is not configured, for example 31113.

For more information about the `localopts` file, see the section about setting local options in *Administration Guide*.

4. If you have a dynamic domain manager in your environment, repeat steps 2 on page 308 and 3 on page 308 on the dynamic domain manager to have the dynamic domain manager function correctly with the on-cloud master domain manager. The dynamic domain manager stays in the on-premises environment.
5. If you want to use custom SSL certificates, edit the paths in the `localopts` file specifying the paths to the custom certificates and using the same names as the default certificates. For more information about secure connections, see [Connection security overview on page 173](#), and specifically Extending communication scenarios to other server components. For more information about secure connections, see the section about connection security overview in *Administration Guide*.
6. Stop IBM® Workload Scheduler Batchman process by running this command:

```
conman stop
```

7. Stop IBM® Workload Scheduler Netman process by running this command:

```
conman shut
```

8. Restart IBM® Workload Scheduler processes by running these commands:

```
StartUp
```

```
conman start
```

9. You can optionally configure your on-premises fault-tolerant agents for communicating with the on-cloud master domain manager, by performing this procedure on each fault-tolerant agent.

Cloud-side operations

Before you begin

If you are using OpenShift, the connection between the on-premises master domain manager and the on-cloud backup master domain manager takes place through routes; therefore, it is recommended to use short names for namespaces, especially if the cluster name is long. This is because workstation host names cannot exceed 51 characters, therefore, the route must comply with this maximum character length.

About this task

Perform the following operations on the cloud side:

1. Download the latest product version. See
 - If you are using Amazon EKS, see [IBM Workload Automation](#) for information about downloading images, installing, and configuring the product.
 - If you are using OpenShift, see the section about Deploying product components on Red Hat OpenShift, V4.x in *Planning and Installation Guide*

2. Open the `values.yaml` file to configure a new server instance.

If you want to deploy only a new server without the Agent and Console applications, set the **enableAgent** and **enableConsole** parameters to `false`.

3. Set the following database parameters to have the new server instance point the database of the on-premises master domain manager. These values must match the values defined for the on-premises master domain manager.

```
db:
  adminUser: <admin_dbuser>
  hostname: <db_host>
  name: <db_name>
  port: <db_port>
  sslConnection: false
  tsName: null
  tsPath: null
  tsTempName: null
  tssbpace: null
  type: <db_type>
  usepartitioning: true
  user: <db_user>
```

This automatically configures the on-cloud server as a backup master domain manager for the on-premises master domain manager.

4. Set the **server.enableSingleInstanceNetwork** parameter to `true` to create an additional load balancer for each server pod. This is used to connect the backup master domain manager inside the cluster with master domain manager outside the cluster. For more information about parameters, see the **Configuration Parameters** section in [IBM Workload Automation](#).
5. To deploy the new server instance in a cloud environment, `type`:

```
helm install -f values.yaml workload_automation_release_name workload/ibm-workload-automation-prod
-n workload_automation_namespace
```

where:

`workload_automation_release_name`

is the name of the release, for example `hwa`.

Result

When you deploy the backup master domain manager on the cloud, it is automatically configured as follows, in full SSL mode with the on-premises master domain manager:

```
CPUNAME HWA-SERVER-0
DESCRIPTION "FTA CPU"
OS UNIX
NODE hwa-waserver-0.hwa-test TCPADDR 31111
SECUREADDR 443
DOMAIN MASTERDM
FOR MAESTRO
TYPE FTA
AUTOLINK ON
BEHINDFIREWALL OFF
```

```
SECURITYLEVEL FORCE_ENABLED
FULLSTATUS ON
END
```

where

hwa-waserver-0.hwa-test

Is the name of the ingress-type network being configured, if you are using an ingress-type network for EKS.

If you are using a load-balancer network, the `NODE` parameter is automatically set to the IP address of the load balancer. For more information, see the **Network enablement** section in [IBM Workload Automation](#).

If you are deploying on OpenShift, this parameter is automatically set to the OpenShift network route. For more information, see the readmes available in [Deploying product components on Red Hat OpenShift, V4.x](#).

SECURITYLEVEL

Specifies the type of SSL authentication for the workstation. This parameter is automatically set to `force_enabled`, which means that the workstation uses SSL authentication for all of its connections to all target workstations which are set to this value. The workstation tries to establish a connection in FULLSSL mode and, if the attempt fails, it tries to establish an unsecure connection. For more information about workstation definition parameters, see the section about workstation definition in .

In the same way, the `localopts` file of the backup master domain manager on the cloud is also automatically configured for SSL communication. See the following example:

```
nm SSL full port      =31113
#
nm SSL port          =0
#
SSL key   ="/home/wauser/wadata/FTAcert/TWSClient.key"
SSL certificate ="/home/wauser/wadata/FTAcert/TWSClient.cer"
SSL key pwd ="/home/wauser/wadata/FTAcert/password.sth"
SSL CA certificate ="/home/wauser/wadata/FTAcert/TWSTrustCertificates.cer"
SSL random seed ="/home/wauser/wadata/FTAcert/TWS.rnd"
```

6. To assign full control for all objects to the **wauser**, type the following command:

```
composer mod acl @
```

The following example shows the modified access control list:

```
ACCESSCONTROLLIST FOR ALLOBJECTS
  root FULLCONTROL
  twsuser FULLCONTROL
  wauser FULLCONTROL
END
```

```
ACCESSCONTROLLIST FOLDER /
  root FULLCONTROL
  twsuser FULLCONTROL
```

```
wauser FULLCONTROL
END
```

Switching domain manager capabilities

About this task

Final steps to switch domain manager capabilities permanently

1. To switch the event processor, run the following command either on the master domain manager or backup master domain manager:

```
switcheventprocessor [folder]/workstation
```

For more information about the command, see the section about the switcheventprocessor command in *User's Guide and Reference*.

2. To switch domain management capabilities, run the following command either on the master domain manager or backup master domain manager:

```
switchmgr domain;newmgr
```

For more information about the command, see the section about the switchmgr command in *User's Guide and Reference*.

3. To make the switch permanent, edit from composer the definition of the previous master domain manager. See the following example and notice how the **TYPE** attribute changes from `MANAGER` to `FTA`.

PREVIOUS DEFINITION

```
CPUNAME your_mdm_name
DESCRIPTION "MANAGER CPU"
OS UNIX
NODE your_IP_address TCPADDR 31111
SECUREADDR 31113
DOMAIN MASTERDM
FOR MAESTRO
TYPE MANAGER
AUTOLINK ON
BEHINDFIREWALL OFF
SECURITYLEVEL ENABLED
FULLSTATUS ON
END
```

NEW DEFINITION

```
CPUNAME your_mdm_name
DESCRIPTION "MANAGER CPU"
OS UNIX
NODE your_IP_address TCPADDR 31111
SECUREADDR 31113
DOMAIN MASTERDM
FOR MAESTRO
TYPE FTA
AUTOLINK ON
BEHINDFIREWALL OFF
SECURITYLEVEL ENABLED
```



```
FULLSTATUS ON
END
```

- To make the switch permanent, edit from composer the definition of the previous backup master domain manager. See the following example and notice how the **TYPE** attribute changes from `FTA` to `MANAGER`.

PREVIOUS DEFINITION

```
CPUNAME HWA-SERVER-0
DESCRIPTION "FTA CPU"
OS UNIX
NODE hwa-waserver-0.hwa-test TCPADDR 31111
SECUREADDR 443
DOMAIN MASTERDM
FOR MAESTRO
TYPE FTA
AUTOLINK ON
BEHINDFIREWALL OFF
SECURITYLEVEL FORCE_ENABLED
FULLSTATUS ON
END
```

NEW DEFINITION

```
CPUNAME HWA-SERVER-0
DESCRIPTION "FTA CPU"
OS UNIX
NODE hwa-waserver-0.hwa-test TCPADDR 31111
SECUREADDR 443
DOMAIN MASTERDM
FOR MAESTRO
TYPE MANAGER
AUTOLINK ON
BEHINDFIREWALL OFF
SECURITYLEVEL FORCE_ENABLED
FULLSTATUS ON
END
```

- To make the changes effective, run the following command:

```
JnextPlan -for 0000
```

- Optionally, you can deploy a new backup master domain manager on the cloud by performing a scale-up of the components listed in the `values.yaml` file. To perform this operation, set the `waserver.replicaCount` parameter to a value higher than 1. You can now optionally uninstall your on-premises backup master domain manager.
- To edit the `FINAL` and `FINALPOSTREPORT` job streams, type the following command:

```
composer mod js your_xa#final@ full
```

where:

your_xa

is the name of the extended agent workstation installed with the master domain manager.

Edit the following section:

```
STREAMLOGON old_tws_user
```

as follows:

```
STREAMLOGON wauser
```

8. Delete the FINAL and FINALPOSTREPORTS job streams from the plan, as follows:

```
conman "canc your_xa#FINALPOSTREPORTS"
```

```
conman "canc your_xa#FINAL"
```

9. Submit first the FINAL, and then the FINALPOSTREPORTS job streams into the current plan, as follows:

```
conman sbs your_xa#FINAL
```

```
conman sbs your_xa#FINALPOSTREPORTS
```

10. Reset the value of the **limit** job stream keyword for the FINAL and FINALPOSTREPORTS job streams, both in the database and in the plan, as follows:

```
conman "limit your_xa#FINAL ;10"
```

```
conman "limit your_xa#FINALPOSTREPORTS ;10"
```

11. To have your dynamic agents connect to the on-cloud master domain manager, copy the certificates located in /home/wauser/wadata/ITA/cpa/ita/cert/ and duplicate them to /datadir/ITA/cpa/ita/cert. The certificates to be duplicated are as follows:

- TWSCliantKeyStore.crl
- TWSCliantKeyStoreJKS.jks
- TWSCliantKeyStoreJKS.sth
- TWSCliantKeyStore.kdb
- TWSCliantKeyStore.rdb
- TWSCliantKeyStore.sth

Perform this operation for each on-premises dynamic agent in your environment.

Result

You have now successfully switched your master domain manager to the cloud and set up your dynamic agents to work in SSL mode with the on-cloud master domain manager.

Part VII. Troubleshooting installation, migration, and uninstallation

An overview on troubleshooting installation, migration, and uninstallation of the IBM Workload Scheduler.

Issues dealing with the installation, removal, and configuration of IBM Workload Scheduler and its prerequisites.

For information about issues on the DB2® installation, see the DB2® product documentation.

Chapter 24. Installation log files

The type of log files you find on your system depends on the type of installation you performed.

About this task

To simplify administration, configuration, and backup and recovery, a new default behavior has been implemented with regard to the storage of product data and data generated by IBM® Workload Scheduler, such as logs and configuration information. On UNIX operating systems, these files are now stored by default in the *DATA_DIR*> directory, which you can optionally customize at installation time. By default, this directory is *TWA_home*>/TWSDATA for the server and agent components, and *DWC_home*/DWC_DATA for the Dynamic Workload Console. The product binaries are stored instead, in the installation directory. For more information, see [Master components installation - serverinst script on page 357](#), [Dynamic Workload Console installation - dwcinst script on page 369](#), and [Agent installation parameters - twsinst script on page 108](#).



Note: If you deployed the product components using Docker containers, this is the default behavior and it cannot be modified. However, if you installed the product components using the command-line installation, the `--data_dir` parameter can be used to change the path.

master domain manager or dynamic domain manager and its backup

```
<TWA_home>/TWSDATA/installation/logs
```

Dynamic Workload Console

```
<DWC_home>/DWC_DATA/installation/logs
```

Dynamic agents and fault-tolerant agents

```
<INST_DIR>/TWSDATA/installation/logs/  
twsinst_operating_system>_TWS_user>^product_version_number>.log, see The twsinst log files on page 124.
```

On Windows operating systems, installation log files are stored in the following paths:

master domain manager or dynamic domain manager and its backup

```
<INSTALL_DIR>\logs
```

Dynamic Workload Console

```
<INSTALL_DIR>\logs
```

When you install a fix pack, the suffix at the end of the file name lists the fix pack number in addition to the General Availability version number, for example:

```
serverinst_9.<version_number>.0.<fix_pack_number>.log
```

DB2® installation log files

About this task

For information about DB2® installation log files, see the DB2® documentation.

The twsinst log files

About this task

The twsinst log file name is:

On Windows operating systems:

```
<TWS_INST_DIR>\logs\twsinst_operating_system_TWS_user^version_number.log
```

Where:

TWS_INST_DIR

The IBM Workload Scheduler installation directory. The default installation directory is c :

```
\Program Files\IBM\TWA_TWS_user.
```

operating_system

The operating system.

TWS_user

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

On UNIX operating systems:

```
<TWS_INST_DIR>/TWSDATA/installation/logs/  
twsinst_operating_system_TWS_user^product_version_number.log
```

Where:

TWS_INST_DIR

The IBM Workload Scheduler installation directory. The default installation directory is /opt/

```
IBM/TWA_TWS_user.
```

operating_system

The operating system.

TWS_user

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

Chapter 25. Updating issues on AIX platform

Issues when applying a fix pack on AIX platform.

In case of issues during an update to the latest fix pack level on AIX platforms, stop the WebSphere Application Server Liberty Base, by using the stopappserver command, then retry the update.

For further details about the stopappserver command, see the section about Application server - starting and stopping in *Administration Guide*.



Note: For Dynamic Workload Console only, it is highly suggested to run also the slibclean command to avoid further updating issues. For more details, see [Slibclean Command](#)

Chapter 26. Packaging log files for support

If a problem occurs with an installation that you cannot resolve, the product support team might ask you to send them all of the installation log files.

For more information about log files, see [Installation log files on page 316](#).



Note: Do not remove, add, or modify files in the `<tempDir>/TWA/twsversion_number` directory because this might cause an installation to fail, or prevent the recovery of a failed installation.

Chapter 27. Analyzing return codes for agent installation, upgrade, restore, and uninstallation

Check how your operation completed by analyzing the return codes that are issued by twsinst.

Return codes that you can receive when you are installing, upgrading, restoring, or uninstalling agents. To analyze them and take corrective actions, run the following steps:

On Windows operating systems

1. Display the operation completion return code, by using the following command:

```
echo %ERRORLEVEL%
```

2. Analyze the following table to verify how the operation completed:

Table 27. Windows operating system agent return codes

Error Code	Description	User action
0	Success: The operation completed successfully without any warnings or errors.	None.
1	Generic failure	Check the messages that are displayed on the screen by the script. Correct the error and rerun the operation. If the error persists, search the https://www.ibm.com/support/home/ database for a solution.
2	The installation cannot create the IBM Workload Scheduler user or assign the correct permission to it.	Verify the operating system policies and configuration. Verify the input values. If necessary, create the user manually before you run the installation.
3	The password is not correct or the installation cannot verify it.	Verify the operating system policies and configuration. Verify the input values.
4	The IBM Workload Scheduler installation directory is not empty. You specified as installation folder a directory that exists.	Empty it or specify a different directory.
5	An error occurred checking the IBM Workload Scheduler prerequisites on the workstation.	See the System Requirements Document at IBM Workload Scheduler Detailed System Requirements .
6	The IBM Workload Scheduler registry is corrupted.	Use the recovInstReg option to recover the registry. Then, rerun the operation.

Error Code	Description	User action
7	The upgrade or restore operation cannot retrieve the information from the configuration files.	Check that the previous installation and the <code>localopts</code> , the <code>globalopts</code> , the <code>ita.ini</code> , and the <code>JobManager.ini</code> files are not corrupted. Correct the errors and try again the operation.
8	The upgrade, restore, or uninstallation cannot proceed because there are jobs that are running.	Stop the jobs that are running or wait for these jobs to complete. Restart the operation.
9	The upgrade, restore, or uninstallation cannot proceed because there are files that are locked.	Stop all the processes that are running and close all the activities that can block the installation path. Restart the operation.
10	The upgrade, restore, or uninstallation cannot proceed because there are command lines opened.	Close the command lines. Restart the operation.

On UNIX and Linux operating systems:

1. Display the installation completion return code, by using the following command:

```
echo $?
```

2. Analyze the following table to verify how the installation completed:

Table 28. UNIX or Linux operating system agent return codes

Error Code	Description	User action
0	Success: The installation completed successfully without any warnings or errors.	None.
1	Generic failure.	Check the messages that are displayed on the video by the script. Correct the error and rerun the operation. If the error persists, search the https://www.ibm.com/support/home/ database for a solution.
2	The installation did not find the IBM Workload Scheduler user or its home directory. The IBM Workload Scheduler user	Verify the operating system definition of the IBM Workload Scheduler user.

Error Code	Description	User action
	that you specified either does not exist or does not have an associated home directory.	
3	Not applicable	
4	The IBM Workload Scheduler installation directory is not empty. You specified as installation folder a directory that exists.	Empty it or specify a different directory.
5	An error occurred checking the IBM Workload Scheduler prerequisites on the workstation.	See the System Requirements Document at IBM Workload Scheduler Detailed System Requirements .
6	The IBM Workload Scheduler registry is corrupted.	Use the <code>recovInstReg</code> option to recover the registry. Then, rerun the operation.
7	The upgrade or restore operation cannot retrieve the information from the configuration files.	Check that the previous installation and the <code>localopts</code> , the <code>globalopts</code> , the <code>ita.ini</code> , and the <code>JobManager.ini</code> files are not corrupted. Correct the errors and try again the operation.
8	The upgrade, restore, or uninstallation cannot proceed because there are jobs that are running.	Stop the jobs that are running or wait for these jobs to complete. Restart the operation.
9	The upgrade, restore, or uninstallation cannot proceed because there are files that are locked.	Stop all the processes that are running and close all the activities that can block the installation path. Restart the operation.
10	The upgrade, restore, or uninstallation cannot proceed because there are command lines opened.	Close the command lines. Restart the operation.

Chapter 28. Problem scenarios: install, reinstall, upgrade, migrate, and uninstall

Known problems and troubleshooting

This section describes known problem scenarios that could occur with the installation, re-installation, upgrade, migration, and uninstallation of IBM® Workload Scheduler components.

Default and customized dashboard listing objects released with a fix pack stop working after returning the Dynamic Workload Console to 9.5 GA version

If you install General Availability (GA) version 9.5 and a fix pack on a Dynamic Workload Console and then return the workstation to GA version 9.5, you might experience problems when viewing default and customized dashboard listing objects released with the fix pack.

Cause and solution:

Before you return the Dynamic Workload Console to the GA version level as described in [Returning the Dynamic Workload Console to a previous product version level on page 306](#), perform the following steps to align the version level in the database:

1. Browse to the `<DWC_home>\usr\servers\dwcServer\apps\DWC.ear` path.
2. Locate and rename the following files as follows:
 - `scaffold_dashboard.json` to `scaffold_dashboard_FPn.json`
 - `scaffold_zdashboard.json` to `scaffold_zdashboard_FPn.json`
 - `scaffold_dashboard_95.json` to `scaffold_dashboard.json`
 - `scaffold_zdashboard_95.json` to `scaffold_zdashboard.json`
3. Restart the Dynamic Workload Console by running the following commands:
 - a. `DWC_home\stopAppServer.bat`
 - b. `DWC_home\startAppServer.bat`
4. Verify whether the Dynamic Workload Console default dashboard has reverted to GA version level. you should see that the look and feel has returned to the GA version level.
5. You can now proceed to return the product to the GA version level as described in [Returning the Dynamic Workload Console to a previous product version level on page 306](#).

Upgrading from Version 9.3, the dynamic agent on the backup master domain manager does not work with 9.3 dynamic workload broker component

Upgrading from Version 9.3, the dynamic agent on the backup master domain manager does not work with 9.3 dynamic workload broker component

If you have a master domain manager at version 9.3 and install a backup master domain manager at the latest version level, the dynamic agent on the backup master domain manager, cannot communicate with the master domain manager at version 9.3. This happens because the dynamic agent requires the MASTERAGENTS workstation, which is not available on the master domain manager at version 9.3.

An error similar to the following is returned:

```
AWSITA081E The agent can not send the resource information to your_93_MDM.  
AWKRRP024E An error occurred during the processing of a relationship because the  
source or target does not exist.
```

However, the problem is solved automatically when you switch the master domain manager at version 9.3 with the backup master domain manager at the latest version level, as required for completing the upgrade procedure.

For more information about the upgrade procedure, see [Upgrading on page 199](#).

Error in testing a connection or running reports on an engine returned from Fix Pack 1 to GA level when using an MSSQL or Informix database

If you install General Availability (GA) version 9.5 and a fix pack on a master domain manager using an MSSQL and Informix database and then return the workstation to GA version 9.5, you might experience problems when testing the engine connection and running reports.

When you try to test the engine connection or run a report, the operation fails and the following messages are displayed in the Dynamic Workload Console:

- AWSUI0803W Test connection to *engine_name*: engine successful, database failed.
- AWSUI0360E The JDBC URL is not configured on the selected engine, so the reporting capabilities cannot be used. Contact the IBM® Workload Scheduler administrator.

Cause and solution:

The reporting feature for the MSSQL and Informix databases is released with version 9.5, Fix Pack 1. If you return the master domain manager to the GA version, you can no longer use the reporting feature for the MSSQL and Informix databases. To continue working with the Dynamic Workload Console, disable the database configuration for the reporting feature by performing the following steps:

1. Log in to the Dynamic Workload Console and select Administration > Manage Engines.
2. Click on the engine you returned to the GA version.
3. In the **Database Configuration for Reporting** section, disable the **Enable Reporting** check box.

Error in upgrading the IBM® Workload Scheduler database when using a DB2 database

When you run the configureDB script to upgrade DB2 when upgrading to IBM® Workload Scheduler 9.5 or later, the following error messages are returned:

- ALTER TABLE LOG.LLRC_LOG_RECORDS ADD COLUMN LLRC_DIFFERENCE VARCHAR (4095) DB21034E. The command was processed as an SQL statement because it was not a valid Command Line Processor command.
- QL0670N The statement failed because the row or column size of the resulting table would have exceeded the row or column size limit: "8101". Table space name: "LOG_DAT_8K". Resulting row or column size: "10000". SQLSTATE=54010

Cause and solution:

If you try to upgrade IBM® Workload Scheduler to version 9.5 or later, and the IBM® Workload Scheduler database was created with DB2, the DB2 option **EXTENDED_ROW_SZ** remains set to DISABLE during the upgrade process.

Starting from IBM® Workload Scheduler version 9.5, the LOG.LLRC_LOG_RECORDS table exceeds the table space or buffer pool page size which was previously set to 8 kilobytes and this causes the upgrade process to fail.

You can solve the problem by either changing the EXTENDED_ROW_SZ DB2 configuration parameter or, if you do not want to change this parameter, migrate the tables to a new buffer pool and table space with a page size of 16 kilobytes:

Change the DB2 configuration parameter

Change the DB2 configuration parameter EXTENDED_ROW_SZ to ENABLE.

OR

Create a new buffer pool and table space and migrate the tables to the new table space

1. Create a new buffer pool and table space with a page size of 16 kilobytes instead of 8 kilobytes.
2. Migrate the involved tables, which are defined in the LOG schema, to the new table space.

Installation fails when installing a dynamic agent on Solaris x86-64

Error in certificate management when installing a dynamic agent on Solaris x86-64.

When you install a dynamic agent on Solaris x86-64 and use the **wouser** and **wapassword** parameters to deploy the certificates from the master domain manager, an error similar to the following might occur:

```
ld.so.1: curl: fatal: libidn.so.11: open failed: No such file or directory
```

Cause and solution:

To solve this issue, install the `SUNWgnu-idn` package on your workstation or create a symbolic link to the following path: `unzip_path/Tivoli_LWA_SOLARIS_I386/TWS/bin/tmpcurl`, as follows:

```
ln -s /usr/lib/64/libidn2.so libidn.so.11
```

Then, run the `twinst` command to install the dynamic agent.

Liberty server does not start when applying a fix pack to the backup master domain manager

A failure occurs when applying version 9.5, Fix Pack 4, or later, to a previous fix pack.

If the upgrade process fails starting the Liberty application server, with a message similar to the following:

```
WAINST200I Configuring WLP.  
  
WAINST015E The following command failed:  
  
C:\WA\BKM95\appservertools\startAppServer.bat -directclean  
  
WAINST035I For more details see the installation log file: C:\WA\BKM95\logs\serverinst_9.5.0.04.log.
```

Cause and solution:

It might occur that the previous WebSphere Application Server Liberty Base process, named **javaw**, is still up and running and is already using the application ports.

To solve the problem, proceed as follows:

1. Check if there is a **javaw** process running which is related to the previous version 9.5 fix pack x instance, using the Java version installed in the `JavaExt9.5.0._OLD_FP` path, for example `JavaExt9.5.0.02\jre\jre\bin\javaw.exe`.
2. If you find the **javaw** process, stop it and restart the upgrade process.

Error received when creating MSSQL database

Error received when creating MSSQL database

When creating the database for MSSQL, you might receive an error similar to the following:

```
'CREATE SCHEMA' must be the first statement in a query batch.
```

Cause and solution

When you run the `configureDb` script specifying the `execsql=false` parameter, the `customSQL.sql` and `customSQLAdmin.sql` are created and stored locally.

Before sending them to the database administrator, perform the following steps:

1. Add the following to strings to the `customSQL.sql` file:

```
CREATE SCHEMA EVT  
GO  
CREATE SCHEMA PLN  
GO  
CREATE SCHEMA MDL  
GO  
CREATE SCHEMA LOG  
GO  
CREATE SCHEMA DWB  
GO
```

2. Replace all semicolons (;) with the string `go` in the `customSQL.sql`.
3. Send both files to the database administrator.

4. The database administrator must run the `customSQLAdmin.sql` file on the database server.
5. The database administrator must run the `customSQL.sql` file on the new database created with the previous query.

For more information about the `execsql` parameter and the `configureDb` script, see [Database configuration - configureDB script on page 345](#).

Chapter 29. Uninstalling IBM Workload Scheduler manually

Steps to take when manually uninstalling the IBM Workload Scheduler master domain manager.

How to manually remove the IBM Workload Scheduler master domain manager.

Run the steps listed in the following topics to manually uninstall an IBM Workload Scheduler instance:

- [Uninstalling manually on Windows operating systems on page 328](#)
- [Uninstalling manually on UNIX operating systems on page 330](#)

Read the following topic to learn about known workaround for problems that might affect the IBM Workload Scheduler uninstall:

- [Problems during manual uninstall on page 332](#)

Uninstalling manually on Windows™ operating systems

Steps to take when manually uninstalling the IBM Workload Scheduler master domain manager on a Windows™ operating systems.

Run the following steps to manually remove an IBM Workload Scheduler master domain manager.



Note: If your RDBMS is based on Oracle, browse to the `TWA_home\usr\servers\engineServer\configDropins\overrides` path and check in the `datasource.xml` configuration file the net service name used for your database before uninstalling the master domain manager.

1. Shut down all IBM Workload Scheduler operations and processes

1. On a system prompt, go to the IBM Workload Scheduler installation path.
2. Set the environment by running the `twa_env.cmd` command.
3. Stop the dynamic agent by running the `ShutDownLwa` command.
4. Stop **netman**, **conman** and their child processes by running the `conman "shutdown` command.
5. Stop the event process by running the `conman stopmon` command.
6. Stop the application server process by running the `conman stopappservman` command.
7. In the task manager, verify that the following processes are inactive:

```
netman
appservman
java
mailman
monman
```

As an alternative, you can also stop all processes by shutting down the related IBM Workload Scheduler services from the services panel.

2. Delete the IBM Workload Scheduler services

If you are uninstalling the master domain manager, you must delete the following services:

```
tws_tokensrv_TWS_user
tws_maestro_TWS_user
tws_ssm_agent_TWS_user
tws_netman_TWS_user
tws_cpa_agent_TWS_user
IBMWASService - TWS_user
```

The command to delete a service is:

```
sc delete service_name
```

When you finished, check that the following services are no longer listed in the active services for the *TWS_user*.

Workload Scheduler

Netman

Token service

Common Platform agent

If any of these services is still in the list, reboot the system and check again.

3. Delete the IBM Workload Scheduler files

Delete all the files under the *TWA_install_dir* directory.

4. Drop the IBM Workload Scheduler tables to the RDBMS

On DB2:

Run the following steps:

1. From the program menu, open the DB2 command line processor (CLP).
2. Look for the database name by running the command:

```
list db directory
```

3. If you see an entry named *your_db_name* associated to the IBM Workload Scheduler instance, run the command:

```
drop db your_db_name
```

If the master domain manager was installed on the DB2 client, run steps 1 and 5 also on the system where the master domain manager is installed.

On ORACLE:

Run the following steps:

1. Access the ORACLE command line.
2. Run the command:

```
sqlplus system/password@net_service_name
```

3. Delete all the tables related to the IBM Workload Scheduler instance by running the command:

```
drop user ORACLE_TWS_user cascade;
```

Uninstalling manually on UNIX™ operating systems

Steps to take when uninstalling IBM Workload Scheduler master domain manager manually on UNIX™ operating systems.

To manually remove an IBM Workload Scheduler master domain manager complete the following steps.



Note: If your RDBMS is based on Oracle, browse to the `TWA_DATA_DIR/usr/servers/engineServer/configDropins/overrides` path and check in the `datasource.xml` configuration file the net service name used for your database before uninstalling the master domain manager.

1. Shut down all IBM Workload Scheduler operations and processes

1. On a system prompt, go to the IBM Workload Scheduler installation path.
2. Set the environment by running the `twa_env.sh` command.
3. Stop the dynamic agent by running the `ShutDownLwa` command.
4. Stop the event processor by running the `conman stopmon` command.
5. Stop the application server process by running the `conman stopappservman` command.
6. Stop **netman**, **conman**, and their child processes by running the `conman "shut;wait"` command.
7. To verify that the following processes are inactive, run the command `ps -ef | grep process_name`.

```
netman
appservman
java
mailman
monman
```

2. Delete the IBM Workload Scheduler files

Delete all the files under the `TWS_install_dir` directory.



Note: The `TWS_install_dir` directory is not the IBM Workload Automation directory, as that might also contain a Dynamic Workload Console installation.

3. Drop the IBM Workload Scheduler tables into the RDBMS

On DB2:

Complete the following steps:

1. From the program menu, open the DB2 command-line processor (CLP)
2. Look for the database name by running the command:

```
list db directory
```

- If you see an entry named `your_db_name` associated to the IBM Workload Scheduler instance, run the command:

```
drop db your_db_name
```

- If you see an entry named `your_db_name` associated to the IBM Workload Scheduler instance, run the command:

```
uncatalog db your_db_name_DB
```

- To see which node is attached to the master domain manager, run the command:

```
list node directory
```

- Run the command:

```
uncatalog node your_node
```

If the master domain manager was installed on the DB2 client, perform the same procedure also on the workstation where the master domain manager is installed.

On ORACLE:

Complete the following steps:

- Access the Oracle command line.
- Run the command:

```
sqlplus system/password@net_service_name
```

- Delete all the tables related to the IBM Workload Scheduler instance by running the command:

```
drop user ORACLE_TWS_user cascade;
```

4. Delete the IBM Workload Scheduler administrative user that was created at installation time.

5. Delete the IBM Workload Automation and the IBM Workload Scheduler registries

- Edit the `/etc/TWS/TWSRegistry.dat` file.
- Delete the lines tagged with **TWS_user**.
- Go to the `/etc/TWA` directory which contains two files for each IBM Workload Scheduler instance installed.
- Look for the properties file that applies to the IBM Workload Scheduler instance to remove.
- Delete the properties file and the file with the same filename and extension `.ext`.
- Delete the `/etc/init.d/tebet1-tws_cpa_agent_TWS_user` directory.

6. Remove the Common Platforms Agent configuration file

Remove the file named `/etc/teb/teb_tws_cpa_agent_TWS_user.ini`.

7. Remove WebSphere Application Server Liberty Base

Delete all files located in the `IWA_install_dir/wlp` directory and the `wlp` directory itself.



Note: Do not delete the above files and directories if other components are installed and using WebSphere Application Server Liberty Base, such as the Dynamic Workload Console.

Problems during manual uninstall

The following problem might occur during a manual uninstall:

- [File deletion on Windows too slow on page 332](#)

File deletion on Windows™ too slow

When manually deleting files during a manual uninstallation, the deletion of the files in the path `$TWA_DIR\TWS\stdlist\yyyy.mm.dd\Onnnn.hhmm` is unacceptably slow.

Cause and solution:

This problem is caused by a known Microsoft™ issue on Windows™ operating systems. It occurs when you try to delete the indicated files on the Windows™ system after having uninstalled the master domain manager. To prevent the problem from occurring use **Shift-Canc** to remove these files instead of using the **Delete** menu option, moving them to the recycle bin, or using the **Canc** key on the keyboard.

Part VIII. Uninstalling

An overview on how to uninstall the product.

Uninstalling the product does not remove files created after IBM Workload Scheduler was installed, nor files that are open at the time of uninstallation. If you do not need these files, you must remove them manually. If you intend to reinstall and therefore need to use the files, make a backup before starting the installation process. The uninstallation does not remove your DB2® or Oracle database.



Note: To manually uninstall IBM Workload Scheduler, see [Uninstalling IBM Workload Scheduler manually on page 328](#)

Chapter 30. Uninstalling the main components

Before you begin

Before performing the uninstallation, verify the following:

1. Ensure that the user running the installation process has the following authorization requirements:

Windows™ operating systems

If you set the Windows User Account Control (UAC), your login account must be a member of the Windows™ **Administrators** group or domain administrators with the right, **Act as Part of the Operating System**.

If you set the Windows User Account Control (UAC) on the workstation you must run the installation as **administrator**.

UNIX™ and Linux™ operating systems

root access

2. Ensure that all IBM Workload Scheduler processes, services and the WebSphere Application Server Liberty Base process are stopped, and that there are no active or pending jobs. For information about stopping the processes and services see the topic about starting and stopping processes on a workstation in the *User's Guide and Reference*.

About this task

The following section describes how to uninstall the following components:

- master domain manager or its backup
- dynamic domain manager or its backup
- agents

Results

The uninstallation removes the product files, the registry keys, and on Windows operating systems, also the services. It also removes the binaries related to the installed IBM Workload Scheduler agent.

The uninstallation program does not remove the IBM Workload Scheduler configuration files.

Uninstalling a backup master domain manager

Before you begin

Before uninstalling, verify that the user running the uninstallation process has the following authorization requirements:

Windows™ operating systems

If you set the Windows User Account Control (UAC), your login account must be a member of the Windows™ **Administrators** group or domain administrators with the right, **Act as Part of the Operating System**.

If you set the Windows User Account Control (UAC) on the workstation you must run the installation as **administrator**.

UNIX™ and Linux™ operating systems

root access

About this task

To uninstall a backup master domain manager, perform the following steps:

1. To uninstall the backup master domain manager, you must first remove it from the plan. Set the workstation running the backup master domain manager to `ignore`, using either the `composer mod cpu workstation_name>` command or from the Dynamic Workload Console.
2. Run JnextPlan to generate the new production plan so that the backup master domain manager is removed from the plan.
3. Run the uninstall script.

- a. Change directory using the following command:

```
cd TWA_home>/TWS/tws_tools
```

- b. Run the uninstallation process by running the script as follows:

Windows™ operating systems

```
cscript uninstall.vbs --prompt no --wuser user_name>
```

UNIX™ and Linux™ operating systems

```
./uninstall.sh --prompt no --wuser user_name>
```

where, `user_name>` represents the user for which you want to uninstall the backup master domain manager. The procedure runs without prompting the user to confirm the uninstallation.

4. Run JnextPlan to update the plan with the changes.

Uninstalling a master domain manager

Before you begin

Before uninstalling, verify that the user running the uninstallation process has the following authorization requirements:

Windows™ operating systems

If you set the Windows™ User Account Control (UAC), your login account must be a member of the Windows™ **Administrators** group or domain administrators with the right, **Act as Part of the Operating System**.

If you set the Windows™ User Account Control (UAC) on the workstation you must run the installation as **administrator**.

UNIX® and Linux® operating systems

root access

About this task

To uninstall a master domain manager, perform the following steps:

1. Run the uninstall script.
 - a. Change directory using the following command:

```
cd TWS_home/TWS/tws_tools
```

- b. Start the uninstallation process by running the script as follows:

Windows™ operating systems

```
cscript uninstall.vbs --prompt no --wuser user_name
```

UNIX® and Linux® operating systems

```
./uninstall.sh --prompt no --wuser user_name
```

where, *user_name* represents the user for which you want to uninstall the master domain manager. The procedure runs without prompting the user to confirm the uninstallation.

2. Drop the IBM Workload Scheduler tables to the RDBMS.

On DB2®:

Run the following steps:

- a. From the program menu, open the DB2® command-line processor (CLP).
- b. Look for the database name by running the command:

```
list db directory
```

- c. If you see an entry named *your_db_name* associated to the IBM Workload Scheduler instance, run the command:

```
drop db your_db_name
```

- d. If you see an entry named *your_db_name_DB* associated to the IBM Workload Scheduler instance, run the command:

```
uncatalog db your_db_name_DB
```

- e. To see which node is attached to the master domain manager system run the command:

```
list node directory
```

- f. Run the command:

```
uncatalog node your_node
```

If the master domain manager was installed on the DB2® client, run the same on the system where the master domain manager is installed.

On ORACLE:

Run the following steps:

- a. Access the ORACLE command line.
- b. Run the command:


```
sqlplus system/password@net_service_name
```

- c. Delete all the tables related to the IBM Workload Scheduler instance by running the command:

```
drop user ORACLE_TWS_user cascade;
```

3. Delete the IBM Workload Scheduler administrative user that was created at install time.

Results

The log files generated from this command are located in the following path:

On Windows operating systems

```
TWA_home\logs
```

On UNIX operating systems

```
TWA_DATA_DIR/installation/logs
```

Uninstalling the Dynamic Workload Console

Before you begin

Ensure that all IBM Workload Scheduler processes, services and the WebSphere Application Server Liberty Base process are stopped, and that there are no active or pending jobs. For information about stopping the processes and services see the topic about starting and stopping processes on a workstation in the *IBM Workload Scheduler: User's Guide and Reference*.

About this task

To uninstall the Dynamic Workload Console, perform the following steps:

1. Change directory to the folder containing the uninstallation script:

```
cd DWC_INST_DIR/tools
```

2. Run the uninstallation process by running the script as follows:

Windows™ operating systems

```
cscript uninstall.vbs --prompt no
```

UNIX™ and Linux™ operating systems

```
./uninstall.sh --prompt no
```

The procedure runs without prompting the user to confirm the uninstallation.

Results

The log file generated by this command are located in:

On Windows operating systems

```
<DWC_home>\logs
```

On UNIX operating systems

```
<DWC_DATA_dir>/installation/logs
```

Uninstalling a dynamic domain manager or its backup

Authorization requirements to verify before uninstalling.

Before you begin

1. Before starting to uninstall, verify that the user running the installation process has the following authorization requirements:

Windows™ operating system

If you set the Windows User Account Control (UAC), your login account must be a member of the Windows™ **Administrators** group or domain administrators group with the rights, **Act as Part of the Operating System**.

If you set the Windows User Account Control (UAC) on the workstation you must run the installation as **administrator**.

UNIX™ and Linux™ operating systems

root access

2. Ensure that all IBM Workload Scheduler processes, services and the WebSphere Application Server Liberty Base process are stopped, and that there are no active or pending jobs. For information about stopping the processes and services see *User's Guide and Reference*.

About this task

Before uninstalling a dynamic domain manager, to maintain a correct hierarchy of the IBM Workload Scheduler network, see [Uninstalling a dynamic domain manager maintaining a correct hierarchy in the network on page 339](#).

To uninstall a dynamic domain manager or its backup, perform the following steps:

1. Run the uninstall script.
 - a. Change directory using the following command:

```
cd <TWS_home>/TWS/tws_tools
```

- b. Start the uninstallation process by running the script as follows:

Windows™ operating systems

```
cscript uninstall.vbs --prompt no --wuser user_name>
```

UNIX® and Linux® operating systems

```
./uninstall.sh --prompt no --wuser user_name>
```

where, *user_name*> represents the user for which you want to uninstall the dynamic domain manager. The procedure runs without prompting the user to confirm the uninstallation.

2. Drop the IBM Workload Scheduler tables to the RDBMS.

On DB2®:

Run the following steps:

- a. From the program menu, open the DB2® command-line processor (CLP).
- b. Look for the database name by running the command:

```
list db directory
```

- c. If you see an entry named `your_db_name` associated to the IBM Workload Scheduler instance, run the command:

```
drop db your_db_name
```

- d. If you see an entry named `your_db_name_DB` associated to the IBM Workload Scheduler instance, run the command:

```
uncatalog db your_db_name_DB
```

- e. To see which node is attached to the dynamic domain manager system run the command:

```
list node directory
```

- f. Run the command:

```
uncatalog node your_node
```

If the dynamic domain manager was installed on the DB2® client, run the same on the system where the dynamic domain manager is installed.

On ORACLE:

Run the following steps:

- a. Access the ORACLE command line.
- b. Run the command:

```
sqlplus system/password@net_service_name
```

- c. Delete all the tables related to the IBM Workload Scheduler instance by running the command:

```
drop user ORACLE_TWS_user cascade;
```

3. Delete the IBM Workload Scheduler administrative user that was created at install time.

Uninstalling a dynamic domain manager maintaining a correct hierarchy in the network

To correctly uninstall a dynamic domain manager, perform the following steps:

1. Uninstall the dynamic agents connected to the dynamic domain manager you want to uninstall by using one of the procedures described in this section.
2. In the database, delete the definitions of the workstations of type AGENT that are connected to the dynamic domain manager that you are uninstalling. You can use either the Dynamic Workload Console workload designer or run the following command:

```
composer del ws agent_workstation_name
```

3. Delete the definitions of the workstations of type REM-ENG connected to the dynamic domain manager that you are uninstalling. You can use either the Dynamic Workload Console workload designer or run the following command:

```
composer del ws rem_eng_workstation_name
```

4. Delete the definitions of the workstations of type POOL connected to the dynamic domain manager that you are uninstalling. You can use either the Dynamic Workload Console workload designer or run the following command:

```
composer del ws pool_workstation_name
```

5. Delete the definitions of the workstations of type D-POOL connected to the dynamic domain manager that you are uninstalling. You can use either the Dynamic Workload Console workload designer or run the following command:

```
composer del ws dpool_workstation_name
```

6. Uninstall the dynamic domain manager.
7. Delete the definition of the workstations of type X-AGENT hosted by the dynamic domain manager that you are uninstalling. You can use either the Dynamic Workload Console workload designer, or run the following command:

```
composer del ws x-agent_workstation_name
```

8. Delete the definitions of the workstations of type BROKER of the dynamic domain manager that you are uninstalling. You can use either the Dynamic Workload Console workload designer or run the following command:

```
composer del ws broker_workstation_name
```

Uninstalling agents using the twsinst script

Before you begin

1. Before starting to uninstall, verify that the user running the uninstallation process has the following authorization requirements:

Windows™ operating systems

If you set the Windows User Account Control (UAC), your login account must be a member of the Windows™ **Administrators** group or domain administrators with the right, **Act as Part of the Operating System**.

If you set the Windows User Account Control (UAC) on the workstation, you must run the installation as **administrator**.

On UNIX™ and Linux™ operating systems:

To uninstall a fault-tolerant agent, the user must have **root** access.

To uninstall a dynamic agent that was installed by the **root** user, the user must have **root** access.

To uninstall a dynamic agent that was installed by a non-root user, the uninstaller must use the same login used to install the agent. To find the login value used at installation, see the read-only

`InstallationLoginUser` parameter in the `JobManager.ini` configuration file in the agent.

2. Ensure that you have enough temporary space before starting the uninstallation process.
3. Ensure that all IBM Workload Scheduler processes and services are stopped, and that there are no active or pending jobs. For information about stopping the processes and services, see *Administration Guide*.

Follow these steps to uninstall IBM Workload Scheduler agents using the `twinsinst` script. Depending on the operating system, proceed as follows:

On Windows™ operating systems:

1. Ensure that all IBM Workload Scheduler processes and services are stopped, and that there are no active or pending jobs. For information about stopping the processes and services see *Administration Guide*.
2. Log on as administrator on the workstation where you want to uninstall the product.
3. `twinsinst` for Windows™ is a Visual Basic Script (VBS) that you can run in CScript and WScript mode, from the `installation_dir\TWS`, run the `twinsinst` script as follows:

```
cscript twinsinst -uninst -uname username [-wait minutes]
[-lang lang_id]
[-work_dir working_dir]
```

The uninstallation is performed in the language of the locale and not the language set during the installation phase. If you want to uninstall agents in a language other than the locale of the computer, run the `twinsinst` script from the `installation_dir\TWS` as follows:

```
cscript twinsinst -uninst -uname user_name -lang language
```

where *language* is the language set during the uninstallation.

On UNIX™ and Linux™ operating systems:

1. Log on as root and change your directory to `/installation_dir/TWS`
2. From the `TWS` directory, run the `twinsinst` script as follows:

```
twinsinst -uninst -uname username [-wait minutes]
[-lang lang_id] [-work_dir working_dir]
```

The uninstallation is performed in the language of the locale and not the language set during the installation phase. If you want to uninstall agents in a language other than the locale of the computer, run the `twinsinst` script from the `/installation_dir/TWS` as follows:

```
./twinsinst -uninst -uname user_name -lang language
```

where *language* is the language set during the uninstallation.

-uninst

Uninstalls the IBM Workload Scheduler agent.

-uname *username*

The name of the user for which the IBM Workload Scheduler agent is uninstalled. This user name is not to be confused with the user performing the uninstallation logged on as **administrator** on Windows™ operating systems and as **root** on UNIX™ and Linux™ operating systems.

-wait *minutes*

The number of minutes that the product waits for jobs that are running to complete before starting the uninstallation. If the jobs do not complete during this interval, the uninstallation stops and an error message is displayed. Valid values are integers or **-1** for the product to wait indefinitely. The default is **60** minutes.

-lang *lang_id*

The language in which the `twsinst` messages are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used.



Note: The **-lang** option is not to be confused with the IBM Workload Scheduler supported language packs.

-work_dir *working_dir*

The temporary directory used for the IBM Workload Scheduler installation process files deployment.

On Windows™ operating systems:

If you specify a path that contains blanks, enclose it in double quotation marks. If you do not manually specify a path, the path is set to `%temp%\TWA\twsversion_number>`, where `%temp%` is the temporary directory of the operating system.

On UNIX™ and Linux™ operating systems:

The path cannot contain blanks. If you do not manually specify a path, the path is set to `/tmp/TWA/twsversion_number>`.

The following is an example of a `twsinst` script that uninstalls the IBM Workload Scheduler agent, originally installed for user named **twuser**:

On Windows™ operating systems:

```
cscript twsinst -uninst -uname TWS_user
```

On UNIX™ and Linux™ operating systems:

```
./twsinst -uninst -uname TWS_user
```

Uninstalling agents on IBM i systems

Learn how to uninstall agents on IBM i systems.

To uninstall IBM Workload Scheduler agents on an IBM i system using the `twsinst` script, follow these steps:

1. Ensure that all IBM Workload Scheduler processes and services are stopped, and that there are no active or pending jobs. For information about stopping the processes and services, see *Administration Guide*.
2. Log on as QSECOFR and change your directory to `/installation_dir/TWS`. For example: `/home/user1/TWS` where `user1` is the name of IBM Workload Scheduler user.
3. From the `Installation directory\TWS` directory, run the `twsinst` script as follows:

```
twinst -uninst -uname username [-wait minutes]
[-lang lang_id] [-work_dir working_dir]
```

-uninst

Uninstalls IBM Workload Scheduler.

-uname *username*

The name of the user for which IBM Workload Scheduler is uninstalled. This user name is not the same as the user performing the installation logged on as **QSECOFR**.

-wait *minutes*

The number of minutes that the product waits for jobs that are running to complete before starting the uninstallation. If the jobs do not complete during this intervals the uninstallation stops and an error message is displayed. Valid values are integers or **-1** for the product to wait indefinitely. The default is **60** minutes.

-lang *lang_id*

The language in which the `twinst` messages are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used.

-work_dir *working_dir*

The temporary directory used for the IBM Workload Scheduler installation process files deployment. If you do not manually specify a path, the path is set to `/tmp/TWA/twsversion_number`.

The following example shows a `twinst` script that uninstalls the IBM Workload Scheduler agent, originally installed for `twuser` user:

On IBM i systems:

```
./twinst -uninst -uname TWS_user
```

The twinst script log files on IBM i systems

About this task

The `twinst` log file name is:

```
<TWS_INST_DIR>/twinst_IBM_i_TWS_user^product_version.log
```

Where:

TWS_INST_DIR

The IBM Workload Scheduler installation directory. The default installation directory is `/home/TWS_user`.

TWS_user

The name of the user for which IBM Workload Scheduler was installed, that you supplied during the installation process.

product_version

Represents the product version. For example, for version 9.5 of the product, the value is 9.5.0.00

Appendix A. Reference

Contains the detailed syntax and explanation for all parameters of the commands required for the command-line installation:

- [Database configuration - configureDB script on page 345](#)
- [Master components installation - serverinst script on page 357](#)
- [Dynamic Workload Console installation - dwcinst script on page 369](#)
- [Agent installation parameters - twsinst script on page 108](#)
- [Certificates download to dynamic agents - AgentCertificateDownloader script on page 385](#)

Database configuration - configureDB script

This script creates and populates the IBM Workload Scheduler database

This script is typically used by the database administrator for creating and populating the IBM Workload Scheduler database. For a typical scenario, see [Creating and populating the database on page 58](#).

This section lists and describes the parameters that you can use to create and populate the IBM Workload Scheduler database.

When running the command, you can type parameters and values from a properties file, type them in the command line, or use a combination of both properties file and command line. If a parameter is specified both in the properties file and in the command line, the command line value is used.

The log files generated from this command are located in the following path:

On Windows operating systems

TWA_home\logs

On UNIX operating systems

TWA_DATA_DIR/installation/logs

On z/OS operating system

TWA_DATA_DIR/installation/logs

Syntax for Windows operating systems

Show command usage

```
configureDb -? | --usage | --help
```

Retrieve the command parameters and values from a file

```
configureDb --propfile | -f [property_file]
```

General information

```
[--lang lang_id]
[--work_dir working_directory]
[--wlpdir wlp_directory]
[--componenttype MDM | DDM]
[--dbadminuser db_admin_user]
--dbadminuserpw db_admin_password
[--rdbmstype|-r DB2 | DBZ | ORACLE | MSSQL]
```

The following configuration information for the data source is ignored if **--rdbmstype** is followed by DERBY:

```
[--dbname db_name]
[--dbuser db_user]
[--dbport db_port]
--dbhostname db_hostname
[--dbdriverpath db_driver_path]
--auth_type authentication_type ]
[--iwstname table_space_name]
[--iwstspath table_space_path]
[--iwslogtsname log_table_space]
[--iwslogtspath log_path_table_space]
[--iwsplantsname plan_table_space]
[--iwsplantspath plan_path_table_space]
[--execsql execute_sql]
```

Configuration options when `dbsslconnection=true` or customized certificates are used for SSL connections

```
[--sslkeyfolder keystore_truststore_folder]
[--sslpassword ssl_password]
```

Oracle-only configuration options

```
--dbpassword db_password
[--usePartitioning true | false ]
[--Usage_TsTempName IWS_temp_path]
[--skipdbcheck true | false]
```

DB2 for z/OS-only configuration options

```
[--zlocationname zOS_location_containing_db]
[--zbufferpoolname buffer_pool_in_zOS_location]
```

Syntax for UNIX operating systems

Show command usage

```
configureDb -? | --usage | --help
```

Retrieve the command parameters and values from a file

```
configureDb --propfile | -f [property_file]
```

General information

```
configureDb
[--lang lang_id]
[--work_dir working_directory]
[--wlpdir wlp_directory]
[--componenttype MDM | DDM]
[--dbadminuser db_admin_user]
--dbadminuserpw db_admin_password
[--rdbmstype|-r DB2 | DB2Z | ORACLE | MSSQL | IDS | DERBY]
```

The following configuration information for the data source is ignored if **--rdbmstype** is followed by DERBY:

```
[--dbname db_name]
[--dbuser db_user]
[--dbport db_port]
--dbhostname db_hostname
[--dbdriverpath db_driver_path]
[--informixserver db_server_name]
[--iwstname table_space_name]
[--iwstspath table_space_path]
[--iwslogtsname log_table_space]
[--iwslogtspath log_path_table_space]
[--iwsplantsname plan_table_space]
[--iwsplantspath plan_path_table_space]
[--execsql execute_sql ]
```

Oracle-only configuration options

```
--dbpassword db_password
[--usePartitioning true | false ]
[--Usage_TsTempName IWS_temp_path]
[--skipdbcheck true | false]
```

Informix-only configuration options

```
[--iwssbspace blob_clob_table_space]
```

Configuration options when `dbsslconnection=true` or customized certificates are used for SSL connections

```
[--sslkeysfolder keystore_truststore_folder]
[--sslpassword ssl_password]
```

DB2 for z/OS-only configuration options

```
[--zlocationname zOS_location_containing_db]
[--zbufferpoolname buffer_pool_in_zOS_location]
```

Syntax for z/OS operating system

Show command usage

```
configureDb -? | --usage | --help
```

Retrieve the command parameters and values from a file

```
configureDb --propfile | -f [properties_file]
```

General information

```
configureDb
[--lang lang_id]
[--work_dir working_directory]
[--wlpdir wlp_directory]

[--dbadminuser db_admin_user]
--dbadminuserpw db_admin_password
[--rdbmstype|-r DB2Z | DERBY]
```

The following configuration information for the data source is ignored if **--rdbmstype** is followed by DERBY:

```
[--dbname db_name]
[--dbuser db_user]
[--dbport db_port]
--dbhostname db_hostname
[--dbdriverpath db_driver_path]
[--iwstname table_space_name]
[--iwstspath table_space_path]
[--iwslogtsname log_table_space]
[--iwslogtspath log_path_table_space]
[--iwsplantsname plan_table_space]
[--iwsplantspath plan_path_table_space]
[--execsql execute_sql ]
```

DB2 for z/OS-only configuration options

```
[--zlocationname zOS_location_containing_db]
[--zbufferpoolname buffer_pool_in_zOS_location]
```

Database configuration parameters

-? | --usage | --help

Displays the command usage and exits.

--propfile|-f [properties_file]

Optionally specify a properties file containing custom values for `configureDb` parameters. The default file for the master components is

`image_location/TWS/interp_name/configureDbdatabase_vendor.properties`, while the default file for the Dynamic Workload Console is

`image_location/configureDbdatabase_vendor.properties`. Specifying a properties file is suggested if you have a high number of parameters which require custom values. You can also reuse the file with minimal modification for several installations. If you create a custom properties file, specify its name and path with the **-f** parameter.

--lang lang_id

The language in which the messages returned by the command are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used. If neither **-lang** nor LANG are used, the default codepage is set to SBCS. For a list of valid values for these variables, see the following table:

Table 29. Valid values for -lang and LANG

parameter

Language	Value
Brazilian Portuguese	pt_BR
Chinese (traditional and simplified)	zh_CN, zh_TW
English	en
French	fr
German	de
Italian	it
Japanese	ja
Korean	ko
Russian	ru
Spanish	es



Note: This is the language in which the installation log is recorded and not the language of the installed component instance. The command installs all languages as default.

--work_dir

The working directory where you extract the installation image. It also contains the output produced by the command, such as the SQL statements if you set the **execsql** parameter to **false**. The default value is `/tmp` on UNIX operating systems and `C:\tmp` on Windows operating systems.

[--wlpdir *wlp_directory*]

The path to WebSphere Application Server Liberty Base installation directory. WebSphere Application Server Liberty Base is used to decrypt the passwords you provide in encrypted form. This parameter is required only if you encrypt your passwords with the {xor} or {aes} encoding.

--componenttype

The IBM® Workload Scheduler component for which the database is installed. This parameter is optional and applies only to master components. If you are installing the Dynamic Workload Console, the script detects this automatically and proceeds accordingly. The default value is calculated at run time. Supported values are.

MDM

master domain manager

DDM

dynamic domain manager

--dbadminuser *db_admin_user*

The database administrator user that creates the IBM® Workload Scheduler or Dynamic Workload Console schema objects on the database server. This parameter is optional. The default varies, depending on the database vendor, as follows:

db2admin

when --rdbmstype is followed by DB2

system

when --rdbmstype is followed by ORACLE

sa

when --rdbmstype is followed by MSSQL

informix

when --rdbmstype is followed by IDS

--dbadminuserpw *db_admin_password*

The password for the DB administrator user that creates the IBM® Workload Scheduler schema objects on the database server. This parameter is required. You can optionally encrypt the password. For more information, see [Encrypting passwords \(optional\) on page 57](#).

--rdbmstype|-r *rdbms_type*

The database type. This parameter is optional. Supported databases are:

- DB2. This is the default value for the master components.
- DB2Z
- Oracle
- IDS. Applies to Informix and OneDB.

- MSSQL. Applies to MSSQL and Azure SQL.
- DERBY. Only applies to the Dynamic Workload Console. This is the default value for the Dynamic Workload Console.

--dbname *db_name*

The name of the IBM® Workload Scheduler or Dynamic Workload Console database. This parameter is optional. The default varies, depending on the component you are installing and the database vendor, as follows:

When installing the master components

the following defaults apply:

TWS

when **--rdmstype** is followed by `DB2`

orcl

when **--rdmstype** is followed by `ORACLE`

TWS

when **--rdmstype** is followed by `MSSQL`

TWS

when **--rdmstype** is followed by `IDS`

When installing the Dynamic Workload Console

if you are using a Derby database, this parameter is not required. If you are using a different database, the following defaults apply:

TDWC

when **--rdmstype** is followed by `DB2`

TDWC

when **--rdmstype** is followed by `DB2Z`

orcl

when **--rdmstype** is followed by `ORACLE`

TDWC

when **--rdmstype** is followed by `MSSQL`

TDWC

when **--rdmstype** is followed by `IDS`

--dbuser *db_user*

The database user that has been granted access to the IBM® Workload Scheduler or Dynamic Workload Console tables on the database server. This parameter is optional. The default varies, depending on the component you are installing and the database vendor, as follows:

When installing the master components

the following defaults apply:

db2tws

when **--rdbmstype** is followed by `DB2`

twsora

when **--rdbmstype** is followed by `ORACLE`

sa

when **--rdbmstype** is followed by `MSSQL`

idstws

when **--rdbmstype** is followed by `IDS`

When installing the Dynamic Workload Console

the following defaults apply:

db2dwc

when **--rdbmstype** is followed by `DB2`

root

when **--rdbmstype** is followed by `DB2Z`

twsora

when **--rdbmstype** is followed by `ORACLE`

sa

when **--rdbmstype** is followed by `MSSQL`

idsdwc

when **--rdbmstype** is followed by `IDS`

--dbport *db_port*

The port of the database server. This parameter is optional. The default varies, depending on the database vendor, as follows:

50000

when **--rdbmstype** is followed by `DB2`

446

when **--rdbmstype** is followed by `DB2Z`

1521

when **--rdbmstype** is followed by `ORACLE`

1433

when **--rdbmstype** is followed by `MSSQL`

16175

when **--rdbmstype** is followed by `IDS`

--dbhostname *db_hostname*

The host name or IP address of database server. This parameter is required.

--dbdriverpath *db_driver_path*

The path where the database drivers are stored. This parameter is optional. By default, the configuration script references the JDBC drivers supplied with the product images. If your database server is not compatible with the supplied drivers, then contact your database administrator for the correct version to use with your database server and specify the driver path using this parameter. Ensure you provide the same path in the `configureDb`, `serverinst`, and `dwcinst` commands. For more information, see [What if my database server does not support the drivers supplied with the product images? on page 215](#).

--informixserver

Specifies the name of the Informix or OneDB database server. This parameter is required only if **--rdbmstype** is set to `IDS` and is supported only on UNIX operating systems.

--iwstsnam|tn *table_space_name*

The name of the tablespace for IBM® Workload Scheduler data. This parameter is optional for all databases with the exception of the Oracle database. The default value for all databases other than Oracle is **TWS_DATA**.

--iwstspath|tp *table_space_path*

The path of the tablespace for IBM® Workload Scheduler data. This parameter is optional. The default value for all databases other than Oracle is **TWS_DATA**. Only on Windows systems hosting an MSSQL database, ensure the folder for the tablespace is already existing before running the `configureDb` command and specify the path using this parameter. Specify the path using forward slashes (`/`), for example: `c:/<my_path>/TWS_DATA`.

--iwslogtsnam|ln *log_table_space*

The name of the tablespace for IBM® Workload Scheduler log. This parameter is optional for all databases with the exception of the Oracle database. The default value for all databases other than Oracle is **TWS_LOG**. This parameter applies only to the master components.

--iwslogtspath|lp *log_path_table_space*

The path of the tablespace for IBM® Workload Scheduler log. This parameter is optional. The default value for all databases other than Oracle is **TWS_LOG**. This parameter applies only to the master components. Only on Windows systems hosting an MSSQL database, ensure the folder for the tablespace is already existing before running the `configureDb` command and specify the path using this parameter. Specify the path using forward slashes (`/`), for example: `c:/<my_path>/TWS_LOG`.

--iwsplantsname|-pn *plan_table_space*

The name of the tablespace for IBM® Workload Scheduler plan. This parameter is optional for all databases with the exception of the Oracle database. The default value for all databases other than Oracle is **TWS_PLAN**. This parameter applies only to the master components.

--iwsplantspath|-pp *plan_path_table_space*

The path of the tablespace for IBM® Workload Scheduler plan. This parameter is optional. The default value for all databases other than Oracle is **TWS_PLAN**. This parameter applies only to the master components. Only on Windows systems hosting an MSSQL database, ensure the folder for the tablespace is already existing before running the configureDb command and specify the path using this parameter. Specify the path using forward slashes (/), for example: `c:/<my_path>/TWS_PLAN`.

--execsql|-es *execute_sql*

Set to **true** to generate and run the SQL file, set to **false** to generate the SQL statement without running it. The resulting files are stored in the path defined in the **--work_dir** parameter. This option is useful if you want to review the file before running it. This parameter is optional. The default value is **true**.

--auth_type

This argument applies to Windows operating systems only. Specify the authentication type. Supported values are as follows:

SQLSERVER

Enables MSSQL authentication type. Only the user specified with the **--dbadminuser** argument has the grants to administer the IBM® Workload Scheduler or Dynamic Workload Console database.

WINDOWS

Enables Windows authentication type. The Windows user you used to log on to the workstation is assigned the grants to administer the IBM® Workload Scheduler or Dynamic Workload Console database.

The default value is **SQLSERVER**.

Oracle-only configuration syntax**--dbpassword *db_password***

The password for the user that has been granted access to the IBM® Workload Scheduler or Dynamic Workload Console tables on the database server. This parameter is required only if you are using an Oracle database. You can optionally encrypt the password. For more information, see [Encrypting passwords \(optional\) on page 57](#).

--usePartitioning

Only applies when installing the master domain manager. Set to **true** if you want to use the Oracle partitioning feature, otherwise set it to **false**. This parameter is optional. The default value is **true**.

--Usage_TsTempName *IWS_temp_path*

Only applies when installing the master domain manager. The path of the tablespace for IBM Workload Scheduler temporary directory. This parameter is optional. The default value is **TEMP**.

--skipdbcheck

This parameter specifies whether the check on the existence of the Workload Automation schema for the Oracle user is performed or not. By default, the parameter is set to **false** and a check is performed on the Oracle user. If the user does not exist, the script then proceeds to create the user and the Workload Automation schema.

If you have already created your Oracle user, set this parameter to **true**. As a result, the check is skipped and the schema creation is performed also if the Oracle user is already existing.

This parameter is optional.

Informix-only configuration syntax**--iwssbspace *blob_clob_table_space***

The name of the table space for blob and clob data. The default value is **twssbspace**.

DB2-only configuration syntax**--sslkeyfolder**

The name and path of the folder, containing either the keystore (`TWSServerKeyFile.jks`), the key database (`TWSClientKeyStore.kdb`), and the truststore (`TWSServerTrustFile.jks`, `TWSClientKeyStoreJKS.jks`) files, you need to provide when supplying custom certificates (only on UNIX operating systems), or certificates in `.PEM` format:

- Only on UNIX operating systems, if you provide the keystore and truststore files, these files are used to configure SSL communication using the passwords you provide with the **--keystorepassword** and **--truststorepassword** respectively.



Note: When installing using the keystore, key database, and truststore files, you are required to manually configure these files prior the installation setup. If providing custom `.jks` files, it is your responsibility to provide such `.jks` files equipped with all the CA certificates they need in the truststore. For these reasons, this procedure is not recommended.

- If you provide `.PEM` certificates, the installation program automatically generates the keystore and truststore files using the password you specify with the **--sslpassword** parameter. The folder must contain the following files:

- **ca.crt**
The Certificate Authority (CA) public certificate.
- **tls.key**
The private key for the instance to be installed.
- **tls.crt**
The public part of the previous key.

You can optionally create a subfolder to contain one or more *.crt files to be added to the server truststore as trusted CA. This can be used for example to add to the list of trusted CAs the certificate of the LDAP server or DB2 server. Additionally, you can store here any intermediate CA certificate to be added to the truststore. The subfolder must be named **additionalCAs**.

This parameter is required if you set the **--dbsslconnection** parameter to true.

--sslpassword

If you provide .PEM certificates with the **--sslkeyfolder** parameter, this is the password for the certificates automatically generated by the installation program. This parameter is mutually exclusive with the **keystorepassword** and **truststorepassword** parameters, which apply when you provide the keystore and truststore files using the **sslkeyfolder** parameter.

DB2 for z/OS-only configuration syntax

--zlocationname *zos_location_containing_db*

The name of an already existing location in the z/OS environment that will contain the new database. The default value is LOC1.

--zbufferpoolname *buffer_pool_in_zos_location*

The name of an already existing buffer pool created in the location specified by `-zlocationname`. The default value is BP32K.

Comments



Note: The following parameters are also required when installing the master components and their values must be the same:

- **--rdmstype**
- **--dbhostname**
- **--dbport**



- **--dbname**
- **--dbuser**

Master components installation - serverinst script

The master domain manager, backup domain manager, dynamic domain manager, backup dynamic domain manager, and installation parameters that can be defined for the serverinst script.

This section lists and describes the parameters that are used when running a **serverinst** script to install the master domain manager and backup domain manager, dynamic domain manager, and backup dynamic domain manager.

When running the command, you can type parameters and values from a properties file, type them in the command line, or use a combination of both properties file and command line. If a parameter is specified both in the properties file and in the command line, the command line value is used.

The log files generated from this command are located in the following path:

On Windows operating systems

TWA_home\logs

On UNIX operating systems

TWA_DATA_DIR/installation/logs

Syntax

On Windows™ operating systems:

Show command usage

```
cscript serverinst.vbs -? | --usage | --help
```

Retrieve the command parameters and values from a properties file

```
cscript serverinst.vbs --propfile|-f [properties_file]
```

General information

```
cscript serverinst.vbs
--acceptlicense yes|no
[--lang lang_id]
[--inst_dir install_dir]
[--work_dir working_dir]
[--skipcheckprereq true|false]
[--skipcheckemptydir true|false]
[--skipusercheck true|false]
```

Configuration information for the data source

```
[--rdbmstype|-r DB2® | ORACLE | MSSQL]
[--dbname db_name]
```

```
[--dbuser db_user]
--dbpassword db_password
[--dbport db_port]
--dbhostname db_hostname
[--dbdriverpath db_driver_path]
[--dbsslconnection true | false]
```

Configuration options when `dbsslconnection=true` or customized certificates are used for SSL connections

```
[--sslkeysfolder keystore_truststore_folder]
[--sslpassword ssl_password]
```

User information

```
[--wadomain]
[--wouser wa_user]
[--wapassword wa_password]
```

Configuration information for the application server

```
--wlpdir|-w wlp_directory
[--httpport http_port]
[--httpsport https_port]
[--bootstrapport bootstrap_port]
[--bootsecport bootstrap_sec_port]
[--startserver true | false]
```

Configuration information for dynamic scheduling

```
[--displayname agent_name]
[--jimport port_number]
```

Configuration information for the master domain manager

```
[--componenttype MDM | DDM]
```

Configuration options when component type is MDM

```
[--company company_name]
[--hostname hostname]
[--thiscpu workstation]

[--eifport eif_port]
[--brwsname broker_workstation_name]
[--brnetmanport broker_netman_port]
[--netmanport netman_port_number]
```

Configuration options when component type is DDM

```

[--domain domain_name]
--master domain_name
--mdmhttpsport
--mdmbrokerhostname
[--eifport eif_port]
[--brwksname broker_workstation_name]
[--brnetmanport broker_netman_port]
[--netmanport netman_port_number]

[--isforzos yes/no]

```

On UNIX® operating systems

Show command usage

```
./serverinst.sh -? | --usage | --help
```

Retrieve the command parameters and values from a properties file

```
./serverinst.sh --propfile|-f [properties_file]
```

General information

```

./serverinst.sh
--acceptlicense yes|no
[--lang lang_id]
[--inst_dir install_dir]
[--work_dir working_dir]
[--data_dir wa_datadir]
[--skipcheckprereq true/false]
[--skipcheckemptydir true/false]

```

Configuration information for the data source

```

[--rdbmstype|-r DB2® | ORACLE | MSSQL | IDS]
[--dbname db_name]
[--dbuser db_user]
--dbpassword db_password
[--dbport db_port]
--dbhostname db_hostname
[--dbdriverpath db_driver_path]
[--dbsslconnection true | false]
--informixserver db_server

```

Configuration options when `dbsslconnection=true` or customized certificates are used for SSL connections

```

[--sslkeysfolder keystore_truststore_folder]
[--sslpassword ssl_password]

```

User information

```
--wuser wa_user  
--wpassword wa_password
```

Configuration information for the application server

```
--wlpdir|-w wlp_directory  
[--httpport http_port]  
[--httpsport https_port]  
[--bootstrapport bootstrap_port]  
[--bootsecport bootstrap_sec_port]  
[--startserver true | false]
```

Configuration information for dynamic scheduling

```
[--displayname agent_name]  
[--jimport port_number]
```

Configuration information for the master domain manager

```
[--componenttype MDM | DDM]
```

Configuration options when component type is MDM

```
[--company company_name]  
[--hostname hostname]  
[--thiscpu workstation]  
  
[--eifport eif_port]  
[--brwsname broker_workstation_name]  
[--brnetmanport broker_netman_port]  
[--netmanport netman_port_number]
```

Configuration options when component type is DDM

```
[--domain domain_name]  
--master domain_name  
--mdmhttpsport  
--mdmbrokerhostname  
--eifport eif_port]  
[--brwsname broker_workstation_name]  
[--brnetmanport broker_netman_port]  
[--netmanport netman_port_number]  
  
[--isforzos yes|no]
```

Arguments

? | --usage | --help

Displays the command usage and exits.

--propfile|-f [*properties_file*]

Optionally specify a properties file containing custom values for `serverinst` parameters. The default file is

On Windows™ systems

```
image_dir>\TWS95_WIN_X86_64_SERVER\TWS\WINDOWS_X86_64\serverinst.properties
```

On UNIX® systems

```
image_dir>/TWS/interp>/serverinst.properties
```

Specifying a properties file is suggested if you have a high number of parameters which require custom values. You can also reuse the file with minimal modification for several installations. If you create a custom properties file, specify its name and path with the `-f` parameter.

General information**--acceptlicense *yes/no***

Specify whether to accept the License Agreement.

--lang *lang_id*

The language in which the messages returned by the command are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used. If neither `-lang` nor LANG are used, the default codepage is set to SBCS. For a list of valid values for these variables, see the following table:

Table 30. Valid values for -lang and LANG

parameter

Language	Value
Brazilian Portuguese	pt_BR
Chinese (traditional and simplified)	zh_CN, zh_TW
English	en
French	fr
German	de
Italian	it
Japanese	ja
Korean	ko
Russian	ru
Spanish	es



Note: This is the language in which the installation log is recorded and not the language of the installed component instance. The command installs all languages as default.

--inst_dir *installation_dir*

The directory of the IBM Workload Scheduler installation. This parameter is optional. The default value is:

On Windows™ operating systems

```
C:\Program Files\wa
```

On UNIX® operating systems

```
/opt/wa
```

--work_dir *working_dir*

The temporary directory used by the program to deploy the installation process files. This parameter is optional. The default value is:

On Windows™ operating systems

```
C:\TMP
```

On UNIX® operating systems

```
/tmp/waversion_number
```

This parameter can also function as a backup directory during product upgrade with path `WORKING_DIR/backup`.

--data_dir *wa_datadir*

UNIX operating systems only. Specify the path to a directory where you want to store the logs and configuration files produced by IBM Workload Scheduler. This parameter is optional. If you do not specify this parameter, all data files generated by IBM Workload Scheduler are stored in the `TWA_home/TWSDATA` directory. This path is called, in the publications, `TWA_DATA_DIR`.

--skipcheckprereq

If you set this parameter to `false`, IBM Workload Scheduler does not scan system prerequisites before starting the installation. This parameter is optional. The default value is `true`. For more information about the prerequisite check, see [Scanning system prerequisites for IBM Workload Scheduler on page 52](#).

-skipcheckemptydir

Set this parameter to `true` to avoid checking whether the installation directory is empty. By default, this parameter is `false`, because starting from version 9.5 the installation directory must be empty. If you set this parameter to `true` and the installation directory is not empty, the installation process might fail.

--skipusercheck

If you set this parameter to `true`, IBM Workload Scheduler, performs no checks on the user. This parameter is optional. The default value is `false`. By default, the following checks are performed:

local user

The script checks if the specified user is existing, has the correct access rights, and the password specified with the `wapassword` parameter is correct. If the user does not exist, the script creates it and grants it the correct access rights. If the specified password is incorrect, the script returns an error and the installation process stops.

domain user

The script checks if the specified user is existing, has the correct access rights, and the password specified with the `wapassword` parameter is correct. If the user does not exist, the script cannot create it and the installation process ends in error. If the user exists but does not have the correct access rights, the script assigns it the required rights. If the specified password is incorrect, the script returns an error and the installation process stops.

Configuration information for the data source

The values for these parameters must match the values defined by the database administrator when creating the database. For more information, see [Creating and populating the database on page 58](#) and browse to the topic for the database you are using.

--rdbmstype|-r *rdbms_type*

The database type. Supported databases are:

- **DB2**
- **ORACLE**
- **MSSQL** This value applies to MSSQL, Azure SQL.
- **IDS** This value applies to both Informix and OneDB.

This parameter is optional. The default value is **DB2**.

--dbname *db_name*

The name of the IBM® Workload Scheduler database. This parameter is optional. The default value is **TWS**.

--dbuser *db_user*

The user that has been granted access to the IBM® Workload Scheduler tables on the database server. This parameter is optional. The default value is **db2tws**.

--dbpassword *db_password*

The password for the user that has been granted access to the IBM® Workload Scheduler or Dynamic Workload Console tables on the database server. This parameter is required. The default value is **password**. You can optionally encrypt the password. For more information, see [Encrypting passwords \(optional\) on page 57](#).

--dbport *db_port*

The port of the database server. This parameter is optional. The default value is **5000**.

--dbhostname *db_hostname*

The host name or IP address of database server. This parameter is required.

--dbdriverpath *db_driver_path*

The path where the database drivers are stored. This parameter is optional. By default, the configuration script references the JDBC drivers supplied with the product images. If your database server is not compatible with the supplied drivers, then contact your database administrator for the correct version to use with your database server and specify the driver path using this parameter. Ensure you provide the same path in the configureDb, serverinst, and dwcinst commands. For more information, see [What if my database server does not support the drivers supplied with the product images? on page 215](#).

--dbsslconnection true | false

Enables or disables the SSL connection to the database. The default value is **false**. This parameter applies only to DB2.

--informixserver

Specifies the name of the Informix or OneDB database server. This parameter is required only if **--rdmstype** is set to `IDS` and is supported only on UNIX operating systems.

Configuration options when `dbsslconnection=true` or customized certificates are used for SSL connections

--sslkeyfolder

The name and path of the folder, containing either the keystore (`TWSServerKeyFile.jks`), the key database (`TWSCliantKeyStore.kdb`), and the truststore (`TWSServerTrustFile.jks`, `TWSCliantKeyStoreJKS.jks`) files, you need to provide when supplying custom certificates (only on UNIX operating systems), or certificates in `.PEM` format:

- Only on UNIX operating systems, if you provide the keystore and truststore files, these files are used to configure SSL communication using the passwords you provide with the **--keystorepassword** and **--truststorepassword** respectively.



Note: When installing using the keystore, key database, and truststore files, you are required to manually configure these files prior the installation setup. If providing custom `.jks` files, it is your responsibility to provide such `.jks` files equipped with all the CA certificates they need in the truststore. For these reasons, this procedure is not recommended.

- If you provide `.PEM` certificates, the installation program automatically generates the keystore and truststore files using the password you specify with the **--sslpassword** parameter. The folder must contain the following files:

- **ca.crt**
The Certificate Authority (CA) public certificate.
- **tls.key**
The private key for the instance to be installed.
- **tls.crt**
The public part of the previous key.

You can optionally create a subfolder to contain one or more *.crt files to be added to the server truststore as trusted CA. This can be used for example to add to the list of trusted CAs the certificate of the LDAP server or DB2 server. Additionally, you can store here any intermediate CA certificate to be added to the truststore. The subfolder must be named **additionalCAs**.

This parameter is required if you set the **--dbsslconnection** parameter to true.

--sslpassword

If you provide .PEM certificates with the **--sslkeyfolder** parameter, this is the password for the certificates automatically generated by the installation program. This parameter is mutually exclusive with the **keystorepassword** and **truststorepassword** parameters, which apply when you provide the keystore and truststore files using the **sslkeyfolder** parameter.

User information

--wuser *user_name*

The user for which you are installing IBM Workload Scheduler. This parameter is optional. The default value is the user performing the installation.

--wapassword *wauser_password*

The password for the user for which you are installing IBM Workload Scheduler.

On Windows operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_) characters, and ()|?*~+.

On UNIX operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_) characters, and ()|?*~+.

. This parameter is required. You can optionally encrypt the password. For more information, see [Encrypting passwords \(optional\) on page 57](#).

Configuration information for the application server

The values for these parameters must match the values defined when installing WebSphere Application Server Liberty Base. For more information, see [Installing WebSphere Application Server Liberty Base on page 55](#).

--wlpdir | w *wlp_directory*

WebSphere Application Server Liberty Base profile installation directory. This parameter is required.

--httpport *http_port*

The HTTP port. This parameter is optional. The default value is **31115**.

--httpsport *https_port*

The HTTPS port. This parameter is optional. The default value is **31116**.

--startserver true | false

Specifies whether the WebSphere Application Server Liberty Base server must be started after installation. This parameter is optional. The default value is **true**.

Configuration information for dynamic scheduling

displayname

The name to be assigned to the agent. The name cannot start with a number. If the host name starts with a number, this parameter is required, otherwise it is optional. The default value is the host name of the workstation followed by **_1**.

jimport *port_number*

The JobManager port number on which the dynamic domain manager is contacted by the dynamic agent. This parameter is optional. The default value is **31114**. The valid range is from 1 to 65535.

Configuration information for the master domain manager

--componenttype *MDM | DDM*

The workstation type being installed. Supported workstation types are:

MDM

master domain manager

DDM

dynamic domain manager

To install a backup domain manager, run the **serverinst** command on the workstation where you plan to install the backup domain manager. The **serverinst** command connects to the database you specify, discovers that a master domain manager is already installed, and proceeds to install a backup domain manager. The same procedure applies when installing a backup dynamic domain manager.

Configuration options when component type is MDM

--company *company_name*

The name of the company. The company name cannot contain blank characters. The name is shown in program headers and reports. This parameter is optional. The default name is **COMPANY**.

--hostname *host_name*

The fully qualified host name or IP address on which the installation is performed. The default value is calculated at installation time.

--thiscpu *workstation*

The name of the IBM Workload Scheduler workstation for this installation. The name cannot exceed 16 characters, cannot start with a number, cannot contain spaces. If the host name starts with a number, this parameter is required, otherwise it is optional. This name is registered in the `localopts` file. The default name is the host name of the workstation.

--eifport *eif_port*

Specifies the Job Manager Event Integration Facility (EIF) port number. The default value is **31131**. The valid range is 1 to 65535.

--brwksname

The broker workstation name. This parameter is optional. The default value is the workstation host name followed by `_DWB`. It cannot start with a number.

--brnetmanport *port_number*

The TCP/IP port number used by the `netman` process to listen for communication from the dynamic domain manager. This parameter is optional. The default value is **41114**. The valid range is from 1 to 65535. This port number is registered in the `localopts` file. For each installation you must specify a different number. For more information about the `localopts` file, see the section about setting local options in *User's Guide and Reference*.

--netmanport *netman_port_number*

The TCP/IP port number used by the `netman` process to listen for communication from the master domain manager. This parameter is optional. The default value is **31111**. The valid range is from 1 to 65535. This port number is registered in the `localopts` file, in the `nm port` attribute. For each installation you must specify a different number.

Configuration options when `componenttype` is DDM**--domain *domain_name***

Windows™ systems only. The domain name of the IBM Workload Scheduler user. This parameter is optional. The default value is **MASTERDM** when you install a master domain manager, and **DYNAMICDM** when you install a dynamic domain manager.

--master

The master domain manager name. It cannot start with a number. This parameter is required for the dynamic domain manager only. Do not specify when installing the master domain manager.

--mdmhttpsport

The port of the master domain manager host used by the broker to contact master domain manager. This parameter is required. This parameter applies to the dynamic domain manager only. Do not specify when installing the master domain manager.

--mdmbrokerhostname

The fully qualified host name or IP address of the master domain manager contacted by the dynamic domain manager. This parameter is required for the dynamic domain manager only. Do not specify when installing the master domain manager.

--eifport eif_port

Specifies the Job Manager Event Integration Facility (EIF) port number. The default value is **31131**. The valid range is 1 to 65535.

--brwksname

The broker workstation name. This parameter is optional. The default value is the workstation host name followed by **_DWB**. It cannot start with a number.

--brnetmanport port_number

The TCP/IP port number used by the `netman` process to listen for communication from the dynamic domain manager. This parameter is optional. The default value is **41114**. The valid range is from 1 to 65535. This port number is registered in the `localopts` file. For each installation you must specify a different number. For more information about the `localopts` file, see the section about setting local options in *User's Guide and Reference*.

--netmanport netman_port_number

The TCP/IP port number used by the `netman` process to listen for communication from the master domain manager. This parameter is optional. The default value is **31111**. The valid range is from 1 to 65535. This port number is registered in the `localopts` file, in the **nm port** attribute. For each installation you must specify a different number.

--isforzos yes/no

Set to **yes** if you want to connect the dynamic domain manager to only the Z controller. Set to **no** if you want to connect the dynamic domain manager to a master domain manager or, to both a master domain manager and a Z controller. This parameter is optional. The default value is **no**.

Comments

Note: The values for the following parameters must match the values you provided when creating and populating the database:

- **--rdbmstype**
- **--dbhostname**
- **--dbport**



- **--dbname**
- **--dbuser**
- **--dbpassword**

See [Creating and populating the database on page 58](#), then follow the link to the database vendor you are using for more information about command parameters.

Dynamic Workload Console installation - dwcinst script

This script installs the Dynamic Workload Console

This section lists and describes the parameters that are used when running a **dwcinst** script to install the Dynamic Workload Console. For a typical installation scenario, see [Installing the Dynamic Workload Console servers on page 100](#).

When running the command, you can type parameters and values from a properties file, type them in the command line, or use a combination of both properties file and command line. If a parameter is specified both in the properties file and in the command line, the command line value is used.



Note: To avoid installation failure, ensure that the `inst_dir` parameter is different from the directory of the installation image.

The log files generated from this command are located in the following path:

On Windows operating systems

`DWC_home\logs`

On UNIX operating systems

`DWC_DATA_dir/installation/logs`

On z/OS operating system

`DWC_DATA_dir/installation/logs`

Syntax

Dynamic Workload Console installation syntax (on Windows)

Show command usage

```
dwcinst -? | --usage | --help
```

Retrieve the command parameters and values from a properties file

```
dwcinst --file | -f [properties_file]
```

General information

```
dwcinst
  --acceptlicense yes|no
  [--lang lang_id]
```

```
[--inst_dir install_dir]
[--skipcheckprereq true|false]
```

Configuration information for the data source

```
[--rdbmstype|-r DB2 | DB2Z | ORACLE | MSSQL | DERBY]
[--dbname db_name]
[--dbuser db_user]
[--dbpassword db_password]
[--dbport db_port]
[--dbhostname db_hostname]
[--dbdriverpath db_driver_path]
[--dbsslconnection true | false]
```

DB2 for z/OS-only configuration options

```
[--zlocationname zOS_location_containing_db]
```

Configuration options when `dbsslconnection=true` or customized certificates are used for SSL connections

```
[--sslkeysfolder keystore_truststore_folder]
[--sslpassword ssl_password]
```

User information

```
--user | -u dwc_user
--password | -p dwc_password
```

Configuration information for the application server

```
--wlpdir|-w wlp_directory
```

Security configuration

```
[--httpport http_port]
[--httpsport https_port]
[--bootstrappport bootstrap_port]
[--bootsecppport bootstrap_sec_port]
```

Dynamic Workload Console installation syntax (on UNIX)

Show command usage

```
dwcinst -? | --usage | --help
```

Retrieve the command parameters and values from a properties file

```
dwcinst --file | -f [properties_file]
```

General information

```

dwcinst
--acceptlicense yes|no
[--lang lang_id]
[--inst_dir install_dir]
[--data_dir dwc_datadir]
[--skipcheckprereq true|false]

```

Configuration information for the data source

```

[--rdbmstype|-r DB2 | DB2Z | ORACLE | MSSQL | IDS | DERBY]
[--dbname db_name]
[--dbuser db_user]
[--dbpassword db_password]
[--dbport db_port]
[--dbhostname db_hostname]
[--dbdriverpath db_driver_path]
[--dbsslconnection true | false]
--informixserver db_server

```

DB2 for z/OS-only configuration options

```

[--zlocationname zOS_location_containing_db]

```

Configuration options when `dbsslconnection=true` or customized certificates are used for SSL connections

```

[--sslkeyfolder keystore_truststore_folder]
[--sslpassword ssl_password]

```

User information

```

--user | -u dwc_user
--password | -p dwc_password

```

Configuration information for the application server

```

--wlpdir|-w wlp_directory

```

Security configuration

```

[--httpport http_port]
[--httpsport https_port]
[--bootstrappport bootstrap_port]
[--bootsecppport bootstrap_sec_port]

```

Dynamic Workload Console installation syntax (on z/OS)

Show command usage

```

dwcinst -? | --usage | --help

```

Retrieve the command parameters and values from a properties file

```
dwcinst --file | -f [properties_file]
```

General information

```
dwcinst
--acceptlicense yes|no
[--lang lang_id]
[--inst_dir install_dir]
[--data_dir dwc_datadir]
```

Configuration information for the data source

```
[--rdbmstype|-r DERBY | DB2Z]
[--dbname db_name]
[--dbuser db_user]
[--dbpassword db_password]
[--dbport db_port]
[--dbhostname db_hostname]
[--dbdriverpath db_driver_path]
```

DB2 for z/OS-only configuration options

```
[--zlocationname zOS_location_containing_db]
```

Configuration options when `dbsslconnection=true` or customized certificates are used for SSL connections

```
[--sslkeysfolder keystore_truststore_folder]
[--sslpassword ssl_password]
```

User information

```
--user | -u dwc_user
--password | -p dwc_password
```

Configuration information for the application server

```
--wlpdir|-w wlp_directory
```

Security configuration

```
[--httpport http_port]
[--httpsport https_port]
[--bootstrapport bootstrap_port]
[--bootsecport bootstrap_sec_port]
```

Dynamic Workload Console installation parameters

-? | -usage | -help

Displays the command usage and exits.

--propfile | -f [properties_file]

Optionally specify a properties file containing custom values for `dwcinst` parameters. The default file is located in the root directory of the installation image.

Specifying a properties file is suggested if you have a high number of parameters which require custom values. You can also reuse the file with minimal modification for several installations. If you create a custom properties file, specify its name and path with the `-f` parameter.

General information

--acceptlicense yes/no

Specify whether to accept the License Agreement.

--lang lang_id

The language in which the messages returned by the command are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used. If neither `-lang` nor LANG are used, the default codepage is set to SBCS. For a list of valid values for these variables, see the following table:

Table 31. Valid values for -lang and LANG

parameter

Language	Value
Brazilian Portuguese	pt_BR
Chinese (traditional and simplified)	zh_CN, zh_TW
English	en
French	fr
German	de
Italian	it
Japanese	ja
Korean	ko
Russian	ru
Spanish	es



Note: This is the language in which the installation log is recorded and not the language of the installed component instance. The command installs all languages as default.

--inst_dir

Specify the directory where the Dynamic Workload Console is to be installed. This parameter is optional.

On Windows operating systems

```
%ProgramFiles%\wa\DWC
```

On UNIX operating systems

```
/opt/wa/DWC
```

On z/OS operating system

```
/opt/wa/DWC
```

--data_dir *dwc_datadir*

Specify the path to a directory where you want to store the logs and configuration files produced by Dynamic Workload Console. This parameter is optional. If you do not specify this parameter, all data files generated by the Dynamic Workload Console are stored in *DWC_home/DWC_DATA*. This path is called, in the publications, *DWC_DATA_dir*.

--skipcheckprereq

If you set this parameter to `false`, Dynamic Workload Console does not scan system prerequisites before starting the installation. This parameter is optional. The default value is `true`. For more information about the prerequisite check, see [Scanning system prerequisites for IBM Workload Scheduler on page 52](#).

Configuration information for the data source

--rdbmstype | -r *rdbms_type*

The database type. Supported databases are:

- DB2
- DB2Z
- ORACLE
- MSSQL
- IDS (only on UNIX operating systems). This value applies to both Informix and OneDB.
- DERBY

This parameter is optional. The default value is **DERBY**. For more information about creating the Dynamic Workload Console database, see [Creating and populating the database on page 58](#).

--dbname *db_name*

The name of the Dynamic Workload Console database. This parameter is optional. The default value is **DWC**.

--dbuser *db_user*

The user that has been granted access to the Dynamic Workload Console tables on the database server. This parameter is required unless you are using Derby.

--dbpassword *db_password*

The password for the user that has been granted access to the Dynamic Workload Console tables on the database server. This parameter is required. You can optionally encrypt the password. For more information, see [Encrypting passwords \(optional\) on page 57](#).

--dbport *db_port*

The port of the database server. This parameter is required unless you are using Derby.

--dbhostname *db_hostname*

The host name or IP address of database server. This parameter is required unless you are using Derby.

--dbdriverpath *db_driver_path*

The path where the database drivers are stored. This parameter is optional. By default, the configuration script references the JDBC drivers supplied with the product images. If your database server is not compatible with the supplied drivers, then contact your database administrator for the correct version to use with your database server and specify the driver path using this parameter. Ensure you provide the same path in the `configureDb`, `serverinst`, and `dwcinst` commands. For more information, see [What if my database server does not support the drivers supplied with the product images? on page 215](#).

--dbsslconnection true | false

Enables or disables the SSL connection to the database. This value must always be **false** when `--rdbmstype` is DB2Z.

The default value is **false**.

--informixserver

Specifies the name of the Informix or OneDB database server. This parameter is required only if `--rdbmstype` is set to `IDS` and is supported only on UNIX operating systems.

Configuration options when `dbsslconnection=true` or customized certificates are used for SSL connections**--sslkeyfolder**

The name and path of the folder, containing either the keystore (`TWSServerKeyFile.jks`), the key database (`TWSClientKeyStore.kdb`), and the truststore (`TWSServerTrustFile.jks`, `TWSClientKeyStoreJKS.jks`) files, you need to provide when supplying custom certificates (only on UNIX operating systems), or certificates in .PEM format:

- Only on UNIX operating systems, if you provide the keystore and truststore files, these files are used to configure SSL communication using the passwords you provide with the **--keystorepassword** and **--truststorepassword** respectively.



Note: When installing using the keystore, key database, and truststore files, you are required to manually configure these files prior the installation setup. If providing custom `.jks` files, it is your responsibility to provide such `.jks` files equipped with all the CA certificates they need in the truststore. For these reasons, this procedure is not recommended.

- If you provide `.PEM` certificates, the installation program automatically generates the keystore and truststore files using the password you specify with the **--sslpassword** parameter. The folder must contain the following files:
 - **ca.crt**
The Certificate Authority (CA) public certificate.
 - **tls.key**
The private key for the instance to be installed.
 - **tls.crt**
The public part of the previous key.

You can optionally create a subfolder to contain one or more `*.crt` files to be added to the server truststore as trusted CA. This can be used for example to add to the list of trusted CAs the certificate of the LDAP server or DB2 server. Additionally, you can store here any intermediate CA certificate to be added to the truststore. The subfolder must be named **additionalCAs**.

This parameter is required if you set the **--dbsslconnection** parameter to true.

--sslpassword

If you provide `.PEM` certificates with the **--sslkeyfolder** parameter, this is the password for the certificates automatically generated by the installation program. This parameter is mutually exclusive with the **keystorepassword** and **truststorepassword** parameters, which apply when you provide the keystore and truststore files using the **sslkeyfolder** parameter.

DB2 for z/OS-only configuration syntax

--zlocationname zos_location_containing_db

The name of an already existing location in the z/OS environment that will contain the new database. The default value is LOC1.

User information

--user

Specify the administrator of the Dynamic Workload Console. You can use this account to log in to the Dynamic Workload Console and manage your environment. This parameter is optional. The default value is `dwcadmin`.

--password

Specify the password for the Dynamic Workload Console user. This parameter is required. You can optionally encrypt the password. For more information, see [Encrypting passwords \(optional\) on page 57](#).

On Windows operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_) characters, and `()|?*~+`.

On UNIX operating systems

Supported characters for the password are alphanumeric, dash (-), underscore (_) characters, and `()|?*~+`.

Configuration information for the application server**--wlpdir**

Specify the path where WebSphere Application Server Liberty Base is installed. This parameter is required.

On z/OS operating system

Specify the path where WebSphere Application Server for z/OS Liberty is installed. This parameter is required.

Security configuration**--httpport**

Specify the HTTP port. This parameter is optional. The default value is 9444.

--httpsport

Specify the HTTPS port, to be used in the Dynamic Workload Console URL. This parameter is optional. The default value is 9443.

--bootstrappport

Specify the bootstrap port. This parameter is optional. The default value is 12809.

--bootsecport

Specify the bootstrap security port, to be used for connecting to the Z connector. This parameter is optional. The default value is 19402.

For a typical installation scenario, see [Installing the Dynamic Workload Console servers on page 100](#).

Agent installation parameters - twsinst script

Agent installation parameters that can be passed to the twsinst script.

About this task

This section lists and describes the parameters that are used when running a **twsinst** script to install the fault-tolerant or dynamic agent.

To see some sample agent installation scenarios see [Example installations on page 116](#) and [Dynamic agent gateway installation examples on page 119](#).

-acceptlicense *yes/no*

Specify whether to accept the License Agreement.

-addjruntime *true/false*

Adds the Java™ run time to run job types with advanced options, both those types that are supplied with the product and the additional types that are implemented through the custom plug-ins. Valid values are **true** and **false**. The default for a fresh installation is **true**. Set this parameter to true if you use the **sslkeyfolder** and **sslpassword** parameters to define custom certificates in **.PEM** format.

This option is applicable to both fault-tolerant agents and dynamic agents.

If you decided not to install Java™ run time at installation time, you can still add this feature later as it is described in [Adding a feature on page 196](#).

-agent *dynamic/fta/both*

The type of agent that you want to install. Valid values are:

dynamic

To install a IBM Workload Scheduler dynamic agent. Use this value with the **-tdwbhostname** *host_name* and the **-tdwbport** *tdwbport_number* parameters.

fta

To install a IBM Workload Scheduler fault-tolerant agent.

both

To install the dynamic agent that is used with the **-tdwbhostname** *host_name* and the **-tdwbport** *tdwbport_number* parameters, and a fault-tolerant agent.

The default is **dynamic**.

-agentid *agentid*

The unique identifier of the agent that you want to install. The parameter is optional. If not specified, the installation process assigns to the agent a string of alphanumeric characters, as in the following example:

```
893164748CCA4FC6820F12685AECBB07
```

It might be useful to specify an *agentid* when you want to reinstall an agent after it was uninstalled, and you want to use the same *agentid*. This prevents that two different *agentid* values are registered on the server for the same agent installation.

-company *company_name*

The name of the company. The company name cannot contain blank characters. The name is shown in program headers and reports. If not specified, the default name is COMPANY.

-create_link

UNIX™ systems only. Create the **symlink** between `/usr/bin/at` and `install_dir/TWS/bin/at`. For more information, see [Table 2: Symbolic link options on page 36](#).

data_dir

This argument applies to UNIX operating systems only. Specify a path for product data, such as log and configuration files, if you want to install the product binaries separated from the product data. This argument is optional. The default value is `INSTALL_DIR/TWSDATA`.

-displayname name

The name to assign to the agent. The name cannot start with a number. The default is the host name of this computer.

If the host name starts with a number, **-displayname** parameter must be specified.

-domain user_domain

Windows™ systems only. The domain name of the IBM Workload Scheduler user. The default is the name of the workstation on which you are installing the product. Ensure you use `USERDOMAIN` instead of `USERDNSDOMAIN`.

-gateway local|remote|none

Specifies whether to configure a gateway to communicate with the dynamic workload broker or not, and how it is configured. Specify `local` if the gateway is local to the dynamic agent workstation. Specify `remote` if the dynamic agent communicates through a gateway that is installed on a different dynamic agent workstation from the dynamic agent being installed. Only for version 9.5 Fix Pack 4, if you set `-gateway` to `remote` and want to install the agent in SSL mode, ensure that the agent can connect directly to the MDM at installation time. This is required only for the time interval necessary for downloading the certificates. (After the download has completed, you can return the agent to communicating through the gateway). The default value is `none`, no gateway is configured.

-gweifport gateway_eif_port

Specifies the Job Manager Event Integration Facility (EIF) port number. The default value is **31132**. The valid range is 1 to 65535.

-gwid gateway_id

The unique identifier for the gateway. This parameter is required when you specify **-gateway** `local`. The default gateway identifier that is assigned is **GW1**. The gateway identifier must start with either an alphabetic character or an underscore character (`_`), and it can contain only the following types of characters: alphabetic, numeric, underscores (`_`), hyphens (`-`), and periods (`.`).

Gateways can also work in parallel to mutually take over in routing communications to the agents connected to them. To enable gateways to work in parallel, all gateways must have the same `gateway_id` assigned. This information is stored in the `JobManagerGW.ini` file, by setting the `JobManagerGWURIs` property.

-hostname *host_name*

The fully qualified hostname or IP address on which the agent is contacted by the dynamic workload broker. The default is the hostname of this computer. If the hostname is a localhost, the hostname parameter must be specified.

-inst_dir *installation_dir*

The directory of the IBM Workload Scheduler installation.

On Windows™ operating systems:

If you specify a path that contains blanks, enclose it in double quotation marks. Specify an absolute path. If you do not manually specify a path, the path is set to %ProgramFiles%\IBM\TWA_TWS_USER, where TWS_USER is the user for which you are installing the IBM Workload Scheduler that you specify in the -uname option.

On UNIX™ and Linux™ operating systems:

If you specify a path that contains blanks, enclose it in double quotation marks. Specify an absolute path. If you do not manually specify a path, the path is set to:

- /opt/IBM/TWA_TWS_USER, if you logged in as the **root** user to install the agent. TWS_USER is the user that you specify in the -uname option and for which you are installing the agent (can omit if TWS_USER is **root**).



Note: The IBM Workload Scheduler user that you specify in the -uname username parameter must have read and run privileges for the installation_dir installation path; otherwise the installation fails.

- home_dir/TWA, if you logged in with a login other than **root**. Ensure that the directory permission is set to **755** for home_dir, the home directory for your login, and that you are the home_dir owner.

-jimport *port_number*

The JobManager port number used by the dynamic workload broker to connect to the IBM Workload Scheduler dynamic agent. The default value is **31114**. The valid range is from 1 to 65535.

-jimportssl *true/false*

The JobManager port used by the dynamic workload broker to connect to the IBM Workload Scheduler dynamic agent. The port value is the value of the ssl_port parameter in the ita.ini file if -jimportssl is set to true. If set to false, it corresponds to the value of the tcp_port parameter in the ita.ini file. The ita.ini file is located in ITA\cpa\ita on Windows™ systems and ITA/cpa/ita on UNIX™, Linux™, and IBM i systems.

Set the value to "true" if - gateway is set to local.

For communication using SSL or HTTPS

Set **importssl = true**. To communicate with the dynamic workload broker, it is recommended that you set the value to **true**. In this case, the port specified in **import** communicates in HTTPS.

For communication without using SSL or through HTTP

Set **importssl = false**. In this case the port specified in **import** communicates in HTTP.

-lang lang_id

The language in which the `twinsinst` messages are displayed. If not specified, the system LANG is used. If the related catalog is missing, the default C language catalog is used. If neither **-lang** nor LANG are used, the default codepage is set to SBCS. For a list of valid values for these variables, see the following table:

Table 32. Valid values for -lang and LANG parameter

Language	Value
Brazilian portuguese	pt_BR
Chinese (traditional and simplified)	zh_CN, zh_TW
English	en
French	fr
German	de
Italian	it
Japanese	ja
Korean	ko
Russian	ru
Spanish	es



Note: This is the language in which the installation log is recorded and not the language of the installed engine instance. `twinsinst` installs all languages as default.

-master workstation

The workstation name of the master domain manager. This name cannot exceed 16 characters, cannot contain spaces, and cannot be the same as the workstation name that you entered in the **thiscpu** parameter. If not specified, the default value is **MASTER**.

-new

A fresh installation of the agent. Installs an agent and all supported language packs.

-password *user_password*

Windows™ systems only. The password of the user for which you are installing IBM Workload Scheduler. The password can include alphanumeric, dash (-), and underscore (_) characters, and the following symbols: (!)? =^*/~ [] \$`+;,:.@. The **-password** parameter is used for fresh installations only, it is not required for fix packs or upgrades.

-port *port_number*

The TCP/IP port number used by the Netman process to listen for communication from the master. The default value is **31111**. The valid range is from 1 to 65535. This port number is registered in the `localopts` file. For each installation you must specify a different number.

-reset_perm

UNIX™ and IBM i systems only. Reset the permission of the libraries in the `/usr/ibm` directory.

-restore

Run this command from the folder to where you copied the elmage (a folder other than the home directory of `TWS_USER`, where `TWS_USER` is the user that installed the IBM Workload Scheduler instance), and not from the installation path, to restore the version in the elmage.

-skip_usercheck

Enable this option if the authentication process within your organization is not standard, thereby disabling the default authentication option.

On Windows™ systems if you specify this parameter, the program does not create the user you specified in the `-uname username` parameter. If you specify this parameter you must create the user manually before running the script.

On UNIX™ and Linux™ systems if you specify this parameter, the program skips the check of the user in the `/etc/passwd` file or the check you perform using the `su` command.

-skipcheckprereq

If you specify this parameter, IBM Workload Scheduler does not scan system prerequisites before installing the agent. For more information on the prerequisite check, see [Scanning system prerequisites for IBM Workload Scheduler on page 52](#).

-sslkeyfolder *path*

The name and path of the local folder containing the certificates in `.PEM` format. The installation program generates the keystore and truststore files using the password you specify with the **-sslpassword** parameter.

tls.sth

The file storing your encoded password.

tls.rnd

The file containing the random seed to be used by OpenSSL.

ca.crt

The Certificate Authority (CA) public certificate.

tls.key

The private key for the instance to be installed.

tls.crt

The public part of the previous key.

You can optionally create a subfolder to contain one or more *.crt files to be added to the server truststore as trusted CA. This can be used for example to add to the list of trusted CAs the certificate of the LDAP server or DB2 server. Additionally, you can store here any intermediate CA certificate to be added to the truststore. The subfolder must be named **additionalCAs**.

If you use this parameter, ensure that the **adjruntime** parameter is set to true, because Java™ run time is required for defining custom certificates in .PEM format.

This parameter is mutually exclusive with the **wauther** and **wapassword** parameters, which are used to download and deploy the certificates already available on the master domain manager.

-sslpassword *password*

Specify the password for the certificates in .PEM format automatically generated by the installation program. If you use this parameter, ensure that the **adjruntime** parameter is set to true, because Java™ run time is required for defining custom certificates.

-tdwbhostname *host_name*

The fully qualified host name of the dynamic workload broker. It is used together with the **-agent** parameter set to either **dynamic** or **both** and the **-tdwbport *tdwbport_number*** parameter. It is necessary to install the dynamic agent. If not specified, you cannot run your workload dynamically and this parameter assumes the **localhost** default value. This value is registered in the **ResourceAdvisorUrl** property in the `JobManager.ini` file.

If you set the **-gateway** parameter to `remote`, this is the host name of the dynamic agent where the gateway resides and to which the agent connects. In this case, the **tdwbport** parameter must match the value of the **jmpport** parameter specified when installing the agent with the local gateway. This information is stored in the `JobManager.ini` file.

-tdwbport *tdwbport_number*

The HTTP or HTTPS transport port number of the dynamic workload broker. It is used together with the **-agent** parameter set to either **dynamic** or **both** and the **-tdwbhostname *host_name*** parameter. It is required if you install the dynamic agent so that the agent can connect to the dynamic workload broker. This number is registered in the **ResourceAdvisorUrl** property in the `JobManager.ini` file. The default value is **31116**. For each installation you must specify a different port number. The valid range is from 0 to 65535. If you specify **0** or do not specify this parameter, you cannot run workload dynamically. Do not specify **0** if the **-agent** value is **dynamic** or **both**. The default is "0" for an upgrade, which means that this connection is not configured, otherwise, specify `31116` for a fresh installation.

If **gateway** *remote* is specified, then this is the HTTP or HTTPS port number of the dynamic agent where the gateway resides and to which the agent connects. You have specified this port with the **import** parameter when installing the agent with the local gateway. If you are performing a fresh installation, then the value to use is 31114. This information is stored in the `JobManager.ini` file.

-thiscpu workstation

The name of the IBM Workload Scheduler workstation of this installation. The name cannot exceed 16 characters, cannot start with a number, cannot contain spaces, and cannot be the same as the workstation name of the master domain manager. This name is registered in the `localopts` file. If not specified, the default value is the host name of the workstation.

If the host name starts with a number, **-thiscpu** parameter must be specified.

-u

Displays command usage information and exits.

-uname username

The name of the user for which the IBM Workload Scheduler agent is being installed. This user owns the IBM Workload Scheduler instance and by default, jobs are run with its name. This user name is not to be confused with the user performing the installation. The user name cannot contain periods (.).

On UNIX™ and Linux™ systems, for a new installation, this user account must be created manually before running the installation and must be enabled to login to the machine where the agent is going to be installed. Create a user with a home directory. IBM Workload Scheduler is installed by default under the home directory of the specified user.

Dynamic agents can be installed on UNIX™ and Linux™ systems also by installers without **root** privileges. When this is the case:

- *username* takes by default the login name of the installer and **uname** can be omitted. If **uname** is specified with a different value than the login of the installer, an error message is returned.
- As a consequence, the agent can run jobs uniquely with the user name of the installer.
- Event Management triggers on files work only if the selected files are accessible to the user that was used for the installation.
- The user must be enabled to login to the machine where the agent is going to be installed

-wauser wauser_name

The user for which you have installed the master domain manager to which the agent is connecting. By providing this information, you enable IBM Workload Scheduler to download and deploy the certificates in **.PEM** format already available on the master domain manager in the `TWA_DATA_DIR/ssl/depot` path to enable secure communication. This parameter is mutually exclusive with the **sslkeyfolder** parameter, which is used to specify a folder on the agent where you store the certificates. This parameter applies to dynamic agents. To manage certificates for fault-tolerant agents, use the **sslkeyfolder** parameter.

-wapassword *wauser_password*

The password for the user for which you have installed the master domain manager to which the agent is connecting. By providing this information, you enable IBM Workload Scheduler to download and install the certificates in **.PEM** format already available on the master domain manager *TWA_DATA_DIR/ssl/depot* path to enable secure communication. This parameter is mutually exclusive with the **sslkeyfolder** parameter, which is used to specify a folder on the agent where you store the certificates. This parameter applies to dynamic agents. To manage certificates for fault-tolerant agents, use the **sslkeyfolder** parameter.

-work_dir *working_dir*

The temporary directory used by the program to deploy the installation process files.

On Windows™ operating systems:

If you specify a path that contains blanks, enclose it in double quotation marks. If you do not manually specify a path, the path is set to `%temp%\TWA\twsversion_number`, where `%temp%` is the temporary directory of the operating system.

On UNIX™ and Linux™ operating systems:

The path cannot contain blanks. If you do not manually specify a path, the path is set to `/tmp/TWA/twsversion_number`.

This parameter can also function as a backup directory during product upgrade with path *WORKING_DIR/backup* if you do not set the **-skipbackup** parameter to **true**.

-v

Displays the command version and exits.

Certificates download to dynamic agents - AgentCertificateDownloader script

This script downloads and deploys certificates in **.PEM** format from the master domain manager to dynamic agents.

This section lists and describes the parameters that are used when running a AgentCertificateDownloader script to download and deploy certificates in **.PEM** format from the master domain manager to the dynamic agents in your environment.

When installing the agent with a fresh installation, you only need to provide the credentials to connect to the master domain manager using the *wauser* and *wapassword* parameters. The certificates in **.PEM** format are automatically downloaded and deployed to the agent without further intervention.

The script connects to master domain manager to retrieve the compressed file containing the certificates, and saves them to the working directory with name *waCertificates.zip*.

Before running the command, ensure the certificates in **.PEM** format are available on the master domain manager in one of the following paths:

On Windows operating systems

```
installation_directory\TWS\ssl\depot
```

On UNIX operating systems

```
TWA_DATA_DIR/ssl/depot
```

The required files are as follows:

tls.sth

The file storing your encoded password.

tls.rnd

The file containing the random seed to be used by OpenSSL.

ca.crt

The Certificate Authority (CA) public certificate.

tls.key

The private key for the instance to be installed.

tls.crt

The public part of the previous key.

If you use this parameter, ensure that the **addjruntime** parameter is set to true, because Java™ run time is required for defining custom certificates in .PEM format.

This parameter is mutually exclusive with the **wouser** and **wapassword** parameters, which are used to download and deploy the certificates already available on the master domain manager.

When running the command, you can type parameters and values from a properties file, type them in the command line, or use a combination of both properties file and command line. If a parameter is specified both in the properties file and in the command line, the command line value is used.

Syntax

Certificate installation syntax on Windows operating systems

Show command usage

```
cscript AgentCertificateDownloader.vbs -? | --usage | --help
```

Retrieve the command parameters and values from a properties file

```
cscript AgentCertificateDownloader.vbs --file | -f [properties_file]
```

General information

```
cscript AgentCertificateDownloader.vbs
--work_dir working_dir
[--displayname agent_name]
--tdwbhostname host_name
```

```

--tdwport tdwport_number
--wuser wuser_name
--wpassword wuser_password

```

Certificate installation syntax on UNIX operating systems

Show command usage

```
./AgentCertificateDownloader.sh --? | --usage | --help
```

Retrieve the command parameters and values from a properties file

```
./AgentCertificateDownloader.sh --file | --f [properties_file]
```

General information

```

./AgentCertificateDownloader.sh
--work_dir working_dir
[--displayname agent_name]
--tdwbhostname host_name
--tdwport port_number
--wuser wuser_name
--wpassword wuser_password

```

AgentCertificateDownloader parameters

--? | --usage | --help

Displays the command usage and exits.

--propfile | --f [*properties_file*]

Optionally specify a properties file containing custom values for AgentCertificateDownloader parameters. The default file is located in the root directory of the installation image.

Specifying a properties file is suggested if you have a high number of parameters which require custom values. You can also reuse the file with minimal modification for several installations. If you create a custom properties file, specify its name and path with the **-f** parameter.

General information

--work_dir *working_dir*

The working directory used to store the `waCertificates.zip` file returned by the command. This compressed file contains the certificates in **.PEM** format retrieved from the master domain manager. This parameter is required and no default value is provided.

--displayname *name*

Specify the name assigned to the agent.

--tdwbhostname *host_name*

The fully qualified host name or IP address of the broker server to which the agent is connected. This parameter is optional. The default value is `localhost`.

--tdwport *tdwport_number*

Specify the port of the broker server to which the agent is connected. This parameter is optional. The default value is 31116.

--wuser *wuser_name*

The user for which you have installed the master domain manager to which the agent is connecting. By providing this information, you enable IBM Workload Scheduler to download and deploy the certificates in **.PEM** format already available on the master domain manager to enable secure communication.

--wpassword *wuser_password*

The password for the user for which you have installed the master domain manager to which the agent is connecting. By providing this information, you enable IBM Workload Scheduler to download and install the certificates in **.PEM** format already available on the master domain manager to enable secure communication.

You can also use the **--wpassword** and **--wuser** parameters to specify a user different from the user which installed the master domain manager by using an ACL, as described in [Downloading certificates using a different user on page 388](#).

For more information about the typical installation procedure, see [Typical installation scenario on page 54](#).

Downloading certificates using a different user

Procedure to download and deploy certificates from the master domain manager to agents using a user different from the user which installed the master domain manager.

About this task

To define a user different from the user which installed the master domain manager, perform the following steps:

1. Browse to the `authentication_config.xml` file located in:

On UNIX operating systems

```
TWA_DATA_DIR/usr/servers/engineServer/configDropins/overrides
```

On Windows operating systems

```
TWA_home\usr\servers\engineServer\configDropins\overrides
```

2. Create a backup copy of the file to a different directory and add the new user and password to the file in the `overrides` directory.
3. Create a new role for the user, as follows:

```
composer new srol
SECURITYROLE DOWNLOAD_CERT_SROLE
FILE DISPLAY
END
```

4. Create a new domain for the user, as follows:

```
composer new sdom
```

```
SECURITYDOMAIN DOWNLOAD_DOMAIN  
FILE NAME="AGENT_CERTIFICATE"  
END
```

5. Create a new access control list for the user, as follows:

```
composer new acl
```

```
ACCESSCONTROLLIST FOR DOWNLOAD_DOMAIN  
other_user DOWNLOAD_CERT_SROLE  
END
```

where *other_user* is the user inserted into `authentication_config.xml`.

Result

You can now use the *other_user*, which has only the DISPLAY role for file `AGENT_CERTIFICATE`, to run the `AgentCertificateDownload` script and download and deploy the certificate.

You can also perform the same operations from the Dynamic Workload Console, as described in the section about managing workload security in *Dynamic Workload Console User's Guide*.

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